

1028462\_1.TXT  
SEQUENCE LISTING

<110> InterCell AG  
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Nagy, Eszter  
Hanner, Markus  
Dewasthaly, Sailesh  
Schneider, Ulrike

<120> S. Pneumoniae Antigens

<130> 05-747

<140> US 10/552,156

<141> 2005-10-11

<150> PCT/EP2004/003984

<151> 2004-04-15

<150> EP 03450087.6

<151> 2003-04-15

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<170> PatentIn version 3.3

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| attatgctat tatttatctt gccaaactttt aatttagcgc agagttatca gcaattactc | 180 |
| caaagacgtc agcaattagc agacttgcaa actcagtatc aaactttgag tgatgaaaag  | 240 |
| gataaggaga cagcatttgc taccaagttg aaagatgaag attatgctgc taaatataca  | 300 |
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| gtggcttttg atgcgggaaa gacgaccttc cggacagaga tgtatgcgga ctataagggt  | 240 |
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| tttatcgatc | tcaaggcgct  | catgggtgat  | aagtcggata  | atatccctgg | ggtgaccaaa  | 600  |
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| gaaaatattg | atggaatgaa  | gacttctaag  | atgaaggaaa  | atctcatcaa | tgacaaggaa  | 720  |
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 gttcaaaaag ccgttcgaga caacgttaaa gacagtatcg atgttcagc agcctaccta 960  
 gaaaaagcca aggggtgaagg tccattcaca gcagggtgtca accatgtgat tccatacgaa 1020  
 ctcttcgcag gtgatggcat gttgactcgt ctcttgctca aggcatctga caaggcacca 1080  
 tggtcagata acggcgacgc taaaaaccca gccctatctc cactaggcga aaacgtgaag 1140  
 accaaaggtc aatacttcta tcaagtagcc ttggacggaa atgtagctgg caaagaaaaa 1200  
 caagcgctca ttgaccagtt ccgagcaaat ggtactcaaa cttacagcgc tacagtcaat 1260  
 gtctatggta acaaagacgg taaaccagac ttggacaaca tcgtagcaac taaaaaagtc 1320  
 actattaaca taaacggttt aatttctaaa gaaacagttc aaaaagccgt tgcagacaac 1380  
 gttaaagaca gtatcgatgt tccagcagcc tacctagaaa aagccaaggg tgaaggcca 1440  
 ttcacagcag gtgtcaacca tgtgattcca tacgaactct tcgcagggtga tggatatgtg 1500  
 actcgtctct tgctcaaggc atctgacaag gcaccatggt cagataacgg tgacgctaaa 1560  
 aaccagccc tatctccact aggtgaaaac gtgaagacca aaggtaata cttctatcaa 1620  
 ttagccttgg acggaaatgt agctggcaaa gaaaaacaag cgctcattga ccagttccga 1680  
 gcaaacggta ctcaaaacta cagcgctaca gtcaatgtct atggtaacaa agacggtaaa 1740  
 ccagacttgg acaacatcgt agcaactaaa aaagtcacta ttaacataaa cggtttaatt 1800  
 tctaaagaaa cagttcaaaa agccgttgca gacaacgtta aggacagtat cgatgttcca 1860  
 gcagcctacc tagaaaaggc caagggtgaa ggtccattca cagcagggtg caaccatgtg 1920  
 attccatacg aactcttcgc aggtgatggc atgttgactc gtctcttgct caaggcatct 1980  
 gacaaggcac catggtcaga taacggcgac gctaaaaacc cagctctatc tccactaggt 2040  
 gaaaacgtga agaccaaagg tcaatacttc tatcaagtag ccttggacgg aaatgtagct 2100  
 ggcaaagaaa aacaagcgct cattgaccag ttccgagcaa acggtactca aacttacagc 2160

1028462\_1.TXT

|  |      |
|--|------|
| gctacagtca atgtctatgg taacaaagac ggtaaaccag acttggacaa catcgtagca  | 2220 |
| actaaaaaag tcactattaa gataaatggt aaagaaacat cagacacagc aaatgggttca | 2280 |
| ttatcacctt ctaactctgg ttctggcgtg actccgatga atcacaatca tgctacaggt  | 2340 |
| actacagata gcatgcctgc tgacaccatg acaagttcta ccaacacgat ggcaggtgaa  | 2400 |
| aacatggctg cttctgctaa caagatgtct gatacgatga tgctagagga taaagctatg  | 2460 |
| ctaccaaata ctggtgagac tcaaacatca atggcaagta ttggtttcct tgggcttgcg  | 2520 |
| cttgcagggt tactcggtgg tctaggtttg aaaaacaaaa aagaagaaaa c           | 2571 |

<210> 6  
 <211> 585  
 <212> DNA  
 <213> Streptococcus pneumoniae

|   |     |
|---|-----|
| <400> 6   |     |
| atgaaatcaa taactaaaaa gattaaagca actcttgcag gagtagctgc cttgtttgca | 60  |
| gtatttgctc catcatttgt atctgctcaa gaatcatcaa cttacactgt taaagaaggt | 120 |
| gatacacttt cagaaatcgc tgaaactcac aacacaacag ttgaaaaatt ggcagaaaac | 180 |
| aaccacattg ataacattca tttgatttat gttgatcaag agttggttat cgatggccct | 240 |
| gtagcgcttg ttgcaacacc agcgccagct acttatgcgg caccagccgc tcaagatgaa | 300 |
| actgtttcag ctccagtagc agaaactcca gtagtaagtg aaacagttgt ttcaactgta | 360 |
| agcggatctg aagcagaagc caaagaatgg atcgctcaaa aagaatcagg tggtagctat | 420 |
| acagctacaa atggacgtta tatcggaagt taccaattaa cagattcata cctgaacggt | 480 |
| gactactcag ctgaaaacca agaacgtgta gcagatgcct acgttgcagg acgttacggt | 540 |
| tcatggactg ctgctaaaaa cttctggctt aacaatggct ggtat                 | 585 |

<210> 7  
 <211> 2232  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |     |
|--|-----|
| <400> 7  |     |
| atgaataaga aaaaaatgat ttttaacaagt ctagccagcg tcgctatctt aggggctggt | 60  |
| tttgttacgt ctcagcctac ttttgtaaga gcagaagaat ctccacaagt tgtcgaaaaa  | 120 |
| tcttcattag agaagaaata tgaggaagca aaagcaaaag ctgatactgc caagaaagat  | 180 |
| tacgaaacgg ctaaaaagaa agcagaagac gctcagaaaa agtatgaaga tgatcagaag  | 240 |
| agaactgagg agaaagctcg aaaagaagca gaagcatctc aaaaattgaa tgatgtggcg  | 300 |
| cttgttgttc aaaatgcata taaagagtac cgagaagttc aaaatcaacg tagtaaatat  | 360 |
| aaatctgacg ctgaatatca gaaaaaatta acagaggctg actctaaaat agagaaggct  | 420 |

## 1028462\_1.TXT

|  |      |
|--|------|
| aggaaagagc aacaggactt gcaaaataaa tttaatgaag taagagcagt tgtagttcct  | 480  |
| gaaccaaagt cgttggctga gactaagaaa aaagcagaag aagctaaagc agaagaaaaa  | 540  |
| gtagctaaga gaaaatatga ttatgcaact ctaaaggtag cactagcgaa gaaagaagta  | 600  |
| gaggctaagg aacttgaaat tgaaaaactt caatatgaaa tttctacttt ggaacaagaa  | 660  |
| gttgctactg ctcaacatca agtagataat ttgaaaaaac ttcttgctgg tgcggatcct  | 720  |
| gatgatggca cagaagttat agaagctaaa ttaaaaaaag gagaagctga gctaaacgct  | 780  |
| aaacaagctg agttagcaaa aaaacaaaca gaacttgaaa aacttcttga cagccttgat  | 840  |
| cctgaaggta agactcagga tgaattagat aaagaagcag aagaagctga gttggataaa  | 900  |
| aaagctgatg aacttcaaaa taaagttgct gatttagaaa aagaaattag taaccttgaa  | 960  |
| atattacttg gaggggctga tcctgaagat gatactgctg ctcttcaaaa taaattagct  | 1020 |
| gctaaaaaag ctgagttagc aaaaaaaca acagaacttg aaaaacttct tgacagcctt   | 1080 |
| gatcctgaag gtaagactca ggatgaatta gataaagaag cagaagaagc tgagttggat  | 1140 |
| aaaaaagctg atgaacttca aaataaagtt gctgatttag aaaaagaaat tagtaacctt  | 1200 |
| gaaatattac ttggaggggc tgattctgaa gatgatactg ctgctcttca aaataaatta  | 1260 |
| gctactaaaa aagctgaatt ggaaaaaact caaaaagaat tagatgcagc tcttaatgag  | 1320 |
| ttaggccctg atggagatga agaagaaact ccagcgccgg ctctcaacc agagcaacca   | 1380 |
| gctcctgcac caaaaccaga gcaaccagct ccagctcaa aaccagagca accagctcct   | 1440 |
| gcacaaaaac cagagcaacc agctccagct ccaaaaccag agcaaccagc tccagctcca  | 1500 |
| aaaccagagc aaccagctaa gccggagaaa ccagctgaag agcctactca accagaaaaa  | 1560 |
| ccagccactc caaaaacagg ctggaaacaa gaaaacggta tgtggtatTT ctacaatact  | 1620 |
| gatggttcaa tggcaatagg ttggctcaa aacaacggtt catggtaacta cctaaacgct  | 1680 |
| aacggcgcta tggcaacagg ttgggtgaaa gatggagata cctggtaacta tcttgaagca | 1740 |
| tcaggtgcta tgaaagcaag ccaatggttc aaagtatcag ataaatggta ctatgtcaac  | 1800 |
| agcaatggcg ctatggcgac aggttggtc caatacaatg gctcatggta ctacctcaac   | 1860 |
| gctaattggtg atatggcgac aggttggtc caatacaacg gttcatggta ttacctcaac  | 1920 |
| gctaattggtg atatggcgac aggttggtc aaagtcaacg gttcatggta ctacctaaac  | 1980 |
| gctaacggtg ctatggctac aggttgggtc aaagtcaacg gttcatggta ctacctaaac  | 2040 |
| gctaacggtt caatggcaac aggttgggtg aaagatggag atacctggta ctatcttgaa  | 2100 |
| gcatcagggtg ctatgaaagc aagccaatgg ttcaaagtat cagataaatg gtactatgtc | 2160 |
| aatggcttag gtgcccttgc agtcaacaca actgtagatg gctataaagt caatgccaat  | 2220 |
| ggtgaatggg tt  | 2232 |

## 1028462\_1.TXT

<210> 8  
 <211> 567  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 8  
 atgaaaaaaa tagttcttgt tagtctagct ttcctttttg tcctggttgg ttgcggacag 60  
 aaaaaagaaa ctggaccagc tacaaaaaca gaaaaagata cgcttcagtc ggcattgcca 120  
 gttattgaaa atgctgagaa gaatacagtt gtaactaaga ctttggtctt gcccaagtca 180  
 gatgatggta gccagcagac acaacaatt acttacaaag acaagacttt tttgagtcta 240  
 gctatccaac aaaaacgtcc agtctctgat gagttgaaga cttatattga ccaacatgga 300  
 gtggaggaaa ctcaaaaagc tcttcttgaa gcgaggaga aggataagtc tatcattgaa 360  
 gctcgtaaat tggcaggttt caaacttgaa aaaaaactat tgagcgcaac ggaacttcaa 420  
 acaacgacta gttttgattt tcaagttctg gatgtcaaga aggcttccca gttggaacat 480  
 ctgaagaata ttggtttgga aaatcttttg aaaaatgaac caagcaaata tatttcagat 540  
 agattggcaa atggcgcgac agaacaa 567

<210> 9  
 <211> 1248  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 9  
 atgtttgaag tagaagaatg gctccatagt cggattgggt tgaattttcg atcaggtttg 60  
 ggtcgaatgc agcaagcggg ggatttggtt ggaaatcctg agcagtccta ccctattatc 120  
 cacgtaacag ggactaatgg gaaaggatct accattgctt ttatgaggga attatttatg 180  
 gggcatggca aaaaagttgc gacctttacc tcccctcata tcgtctctat caatgaccga 240  
 atctgcatta atgggcagcc tatagcagac gcagacttta tccgtttgac tgatcaggtc 300  
 aaggagatgg agaaaacgct tctgcaaact cctgcccagt tgtccttttt tgaattgctg 360  
 accttggttg cttttcttta ttttagggag caggagggtg atttggtttt attagaagtg 420  
 ggaattgggt gcttacttga cacgaccaat gtggtaactg gagagtttgc tgtcatcacc 480  
 tccattgggc ttgaccatca agaaaccttg ggtgatagtc tagaagcaat tgcagagcag 540  
 aaagctggta ttttcaaggc tggtaagaag gcagtgattg cgaaattgcc tccagaagct 600  
 aggcttgcct gtcagaaaaa agccgaatct ttagctgtta acctttatca ggcagggtcaa 660  
 gatTTTTTaa tgctgaatgg tgatttttca agctctttac taaatctttc acagctgaac 720  
 ataggcttag aaggagtcta tcagcaggag aatgcagcct tggcgttgca aacttttctt 780  
 ctttttatga gagaaagaaa ggaagctggt gatgaacagg ctgtaagaaa ggccttgga 840  
 cagaccattt gggctggctg cttggagcgt attcgcacac agattttattt ggatggtgct 900

1028462\_1.TXT

|            |            |            |            |            |            |      |
|------------|------------|------------|------------|------------|------------|------|
| cataacctcc | ctgccttgac | tcgcttggct | gagtttatca | aagaaaaaga | gcaggaaggc | 960  |
| tatcgacctc | aaatcctctt | tggatccttg | aaacgtaagg | attatcaagg | gatgttgggt | 1020 |
| tatctgactg | aaaaattgcc | tcaggtggaa | ctcaaggtga | ccggctttga | ctatcagggg | 1080 |
| gctttggacg | aaagggatgt | gacaggttac | gatatagttt | cttcttaccg | agaatttatc | 1140 |
| agcgattttg | aagaaagggc | agacgctcaa | gacttgctgt | tcgttacagg | gtctctctat | 1200 |
| tttatctcag | aagtacgggg | ctacctgctg | gaccgtgagc | agataaat   |            | 1248 |

<210> 10  
 <211> 831  
 <212> DNA  
 <213> Streptococcus pneumoniae

|            |   |
|------------|---|
| <400> 10   |   |
| gtgggaattc | gtgtttataa accaacaaca aacggctgcc gtaatatgac ttctttggat 60   |
| ttcgttgaaa | tcacaacaag cactcctgaa aaatcattgc ttgttgcatt gaagagcaag 120  |
| gctggtcgta | acaacaacgg tcgtatcaca gttcgtcacc aaggtggtgg acacaaacgt 180  |
| ttctaccggt | tggttgactt caaacgtaat aaagacaacg ttgaagcagt tgttaaaaca 240  |
| atcgagtacg | atccaaacgg ttctgcaaac atcgctcttg tacactacac tgacggtgtg 300  |
| aaagcataca | tcatcgctcc aaaaggtctt gaagtaggtc aacgtatcgt ttcaggtcca 360  |
| gaagcagata | tcaaagtcgg aaacgctctt ccacttgcta acatcccagt tgg tactttg 420 |
| attcacaaca | tcgagttgaa accaggtcgt ggtggtgaat tggtagctgc tgctggtgca 480  |
| tctgctcaag | tattgggttc tgaaggtaaa tatgttcttg ttcgtcttca atcaggtgaa 540  |
| gttcgtatga | ttcttggaac ttgccgtgct acagttggtg ttgtcggaaa cgaacaacat 600  |
| ggacttgtaa | accttggtaa agcaggacgt agccgttggg aaggtatccg cccaacagtt 660  |
| cgtggttctg | taatgaaccc taacgatcac ccacacggtg gtggtgaagg taaagcacca 720  |
| gttggtcgta | aagcaccatc tactccatgg ggcaaacctg ctcttggtct taaaactcgt 780  |
| aacaagaaag | cgaaatctga caaacttatc gttcgtcgtc gcaacgagaa a 831           |

<210> 11  
 <211> 267  
 <212> DNA  
 <213> Streptococcus pneumoniae

|            |  |
|------------|--|
| <400> 11   |  |
| atggctaata | aatcaatggt agctagagag gctaaacgcc aaaaaattgt tgaccgttat 60  |
| gctgaaaaac | gtgctgcatt aaaggcggca ggggactacg aaggtttatc taaattacct 120 |
| cgcaacgcct | caccgactcg ttacataat cggtttaggg ttacggggcg ccacattca 180   |
| gtttaccgca | aatttggtct gagtcgtatc gcttttcgcg aacttgcgca taaaggtcaa 240 |
| attcctggtg | taacaaaagc atcttgg 267                                     |

1028462\_1.TXT

<210> 12  
 <211> 1335  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 12  
 atggatatta gacaagttac tgaaaccatc gccatgattg aggagcaaaa cttcgatatt 60  
 agaaccatta ccatggggat ttctcttttg gactgtatcg atccagatat caatcgtgct 120  
 gcggagaaaa tctatcaaaa aattacgaca aaggcggcta atttagtagc tgttggtgat 180  
 gaaattgcgg ctgagttggg aattcctatc gttaataagc gtgtatcggg gacacctatt 240  
 tctctgattg gggcagcgac agatgcgacg gactacgtgg ttctggcaaa agcgcttgat 300  
 aaggctgcga aagagattgg tgtggacttt attggtgggt tttctgcctt agtacaaaaa 360  
 ggttatcaaa agggagatga gattctcatc aattccattc ctgcgccttt ggctgagacg 420  
 gataaggtct gctcgtcagt caatatcggc tcaaccaagt ctggtattaa tatgacggct 480  
 gtggcagata tgggacgaat tatcaaggaa acagcaaadc tttcagatat gggagtggcc 540  
 aagttggttg tattcgctaa tgctgttgag gacaatccat ttatggcggg tgcctttcat 600  
 ggtgttgggg aagcagatgt tatcatcaat gtcggagttt ctggtcctgg tgttgtgaaa 660  
 cgtgcttttg aaaaagttcg tggacagagc tttgatgtag tagccgaaac agttaagaaa 720  
 actgccttta aaatcactcg tatcgggtcaa ttggttggtc aaatggccag tgagagactg 780  
 ggtgtggagt ttggtattgt ggacttgagt ttggcaccaa cccctgcggg tggagactct 840  
 gtggcacgtg tccttgagga aatggggcta gaaacagttg gcacgcatgg aacgacggct 900  
 gccttggtccc tcttgaacga ccaagttaaa aagggtggag tgatggcctg caaccaagtc 960  
 ggtggtttat ctggtgcctt tatccctggt tctgaggatg aaggaatgat tgctgcagtg 1020  
 caaatggct ctcttaattt agaaaaacta gaagctatga cggctatctg ttctggttga 1080  
 ttggatatga ttgccatccc agaagatacg cctgctgaaa ctattgcggc tatgattgcg 1140  
 gatgaagcag caatcgggtgt tatcaacatg aaaacaacag ctgttcgtat cattcccaa 1200  
 ggaaaagaag gcgatatgat tgagtttggg ggtctattag gaactgcacc cgttatgaag 1260  
 gttaatgggg cttcgtctgt cgacttcatc tctcgcggtg gacaaatccc agcaccaatt 1320  
 catagtttta aaaat 1335

<210> 13  
 <211> 2436  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 13  
 atggtaaata cagaagtagc aagaacaaca atcaagacag aatatttttg cagccttact 60



## 1028462\_1.TXT

|             |            |             |            |              |            |      |
|-------------|------------|-------------|------------|--------------|------------|------|
| gaaaggatga  | acaaatatcg | agaagatggt  | ttaaataaaa | aaccttatat   | tgatgctgag | 120  |
| agagcagttc  | tagcaacacg | cgcctatgaa  | cgatacaagg | aacaacctaa   | tgtcctaaaa | 180  |
| cgtgcatata  | tgctgaaaga | aattttggaa  | aatatgacta | tctatatattga | agaagaatct | 240  |
| atgattgcgg  | gaaatcaagc | ttctttccaat | aaagatgctc | ctatTTTTcc   | ggaatatacg | 300  |
| ctagaatttg  | ttctcaatga | gttggatctt  | tttgaaaagc | gtgatggaga   | tgTTTTctat | 360  |
| attacagaag  | aaacaaaaga | acaacttaga  | agtattgctc | cgTTTTggga   | aaataataat | 420  |
| ttacgtgcta  | gagctggtgc | cttattacct  | gaagaagtgt | ctgTTTTatat  | ggaaacagga | 480  |
| ttcttcggta  | tggaaggtaa | gatgaattct  | ggagatgctc | acttagcagt   | taactatcag | 540  |
| aaactTTTTgc | aatttggttt | aagaggTTTT  | gaagagcggg | ctcgtaaagc   | aaaagtagct | 600  |
| ctagatttaa  | cagatccagc | aagtattgat  | aaatatcatt | tttacgactc   | tatatttatc | 660  |
| gtaatcgatg  | ctattaaagt | atatgcaaag  | cgctttgttg | ctcttgctaa   | aagtttagcc | 720  |
| gaaaatgcaa  | atcctaaacg | taagaaagaa  | ttacttgaga | ttgcagatat   | ttgctctaga | 780  |
| gtcccatatg  | aaccggcaac | tacttttgca  | gaagctattc | aatcagtttg   | gtttattcaa | 840  |
| tgtattttac  | aaattgaatc | taatggccac  | tctctttcat | atggccgttt   | tgatcaatat | 900  |
| atgtatccat  | atatgaaggc | tgatttagaa  | agtggtaaag | aaacagaaga   | tagcattgtt | 960  |
| gaacgtctga  | caaatctttg | gattaagaca  | attacaatta | ataaggttcg   | cagtcaatca | 1020 |
| catacatttt  | cttcagcagg | aagtccttta  | tatcaaaatg | ttacaattgg   | tggacagact | 1080 |
| cgagataaga  | aggatgctgt | taaccatta   | tcttatttgg | tattaaaatc   | agttgcacaa | 1140 |
| acccatctac  | cgcaacctaa | tctaactgta  | cgttaccatg | caggttttaga  | tgctcgtttc | 1200 |
| atgaatgagt  | gtattgaagt | gatgaaactt  | ggTTTTggta | tgcttgcat    | taataatgat | 1260 |
| gagattatta  | ttccttcttt | tattgcaaaa  | ggagtattgg | aagatgatgc   | ttatgattac | 1320 |
| agtgccattg  | gatgtgttga | aacggcagtt  | ccagggaaat | ggggctatcg   | ttgcacaggt | 1380 |
| atgagttata  | tgaacttccc | taaggttcta  | cttatcacga | tgaatgatgg   | aattgatccg | 1440 |
| gcttcgggta  | aacggtttgc | accaagcttt  | ggtcgtttta | aggatatgaa   | gaacttttct | 1500 |
| gaattagaaa  | atgcttggga | taaaacacta  | agatatttga | cacgaatgag   | tgttattggt | 1560 |
| gaaaattcta  | ttgatttatc | attggaacga  | gaagttcctg | atattctatg   | ttcagcattg | 1620 |
| actgatgatt  | gtattggctg | tggaaaacac  | cttaaagaag | gtggagcagt   | atatgattat | 1680 |
| atatcaggat  | tgcaagttgg | aattgcaaat  | ttgtcggatt | cattagctgc   | aattaaaaaa | 1740 |
| ttggtgtttg  | aggaagaacg | tataagccca  | agtcagcttt | ggcatgcact   | ggaaacagat | 1800 |
| tatgccggag  | aagaaggtaa | ggtcattcaa  | gaaatgttga | ttcatgatgc   | acctaagtat | 1860 |
| ggtaatgatg  | atgattatgc | tgacaaattg  | gttactgctg | cttatgacat   | ttatgttgat | 1920 |
| gaaattgcta  | aatatcctaa | tacacgttat  | ggaagagggc | ctattggagg   | aattcgttat | 1980 |

1028462\_1.TXT

|   |      |
|---|------|
| tcaggaacat cttctatctc agccaacgta gggcagggac gtggaacatt agcaactcca   | 2040 |
| gatggacgca acgcgggtac accgtttagca gagggttggt caccatcaca taatatggat  | 2100 |
| caacacggcc ctacatctgt tttaaaatct gtttcaaaat taccaacaga tgaaatcgta   | 2160 |
| ggtgggggttc tcttaaataca gaaagtaaat cctcaaacgt tagccaaaga agaagataaa | 2220 |
| ttaaaactaa ttgcttttgtt acgaacattc tttaatcggt tacatgggta ccatattcaa  | 2280 |
| tacaatgttg tttccagaga gacgctgatt gacgctcaga aacatcctga aaaacacaga   | 2340 |
| gacttaattg ttcgtgttgc aggatactct gcattcttca atgttctttc taaggcaacc   | 2400 |
| caagatgaca ttataggacg tactgagcat actttg                             | 2436 |

<210> 14  
 <211> 390  
 <212> DNA  
 <213> Streptococcus pneumoniae

|   |     |
|---|-----|
| <400> 14<br>atgtcacaag cacaatatgc aggtactgga cgtcgtaaaa acgctgttgc acgcgttcgc | 60  |
| cttgttccag gaactggtaa aatcactgtt aacaaaaaag atgttgaaga gtacatccca             | 120 |
| cacgctgacc ttcgtcttgt catcaaccaa ccattcgcag ttacttcaac tgtaggttca             | 180 |
| tacgacgttt tcgttaacgt tataggtggt ggatacgtg gtcaatcagg agctatccgt              | 240 |
| cacggtatcg ctcgtgccct tcttcaagta gaccagact tccgcgattc attgaaacgc              | 300 |
| gcaggacttc ttacacgtga ctcacgtaaa gttgaacgta agaaaccagg tcttaagaaa             | 360 |
| gctcgtaaag catcacaatt tagtaaacgt  | 390 |

<210> 15  
 <211> 999  
 <212> DNA  
 <213> Streptococcus pneumoniae

|   |     |
|---|-----|
| <400> 15<br>ttggagaaga aactgaccat aaaagacatt gcggaaatgg ctcagacctc gaaaacaacc | 60  |
| gtgtcatttt acctaaacgg gaaatatgaa aaaatgtccc aagagacacg tgaaaagatt             | 120 |
| gaaaaagtta ttcattgaaac aaattacaaa ccgagcattg ttgcgcgtag cttaaaactcc           | 180 |
| aaacgaacaa aattaatcgg tgttttgatt ggtgatatta ccaacagttt ctcaaaccac             | 240 |
| attgttaagg gaattgagga tatcgccagc cagaatggct accaggtaat gataggaaat             | 300 |
| agtaattaca gccaaagagag tgaggaccgg tatattgaaa gcatgcttct cttgggagta            | 360 |
| gacggcttta ttattcagcc gacctctaatt ttccgaaaat attctcgtat catcgatgag            | 420 |
| aaaaagaaga aaatggtctt ttttgatagt cagctctatg aacaccggac tagctggggt             | 480 |
| aaaaccaata actatgatgc cgtttatgac atgaccagct cctgtatcga aaaagggttat            | 540 |

## 1028462\_1.TXT

|           |       |             |            |             |             |            |             |     |
|-----------|-------|-------------|------------|-------------|-------------|------------|-------------|-----|
| gaacat    | ttttc | tcttgattac  | agcggatacg | agtcgtttga  | gtactcggat  | tgagcgggca | 600         |     |
| agtggt    | ttttg | tggtatgcttt | aacagatgct | aatatgcgtc  | acgccagtct  | aaccattgaa | 660         |     |
| gataag    | cata  | cgaatttgga  | acaaattaag | gaat        | tttttac     | aaaaagaaat | cgatccccgat | 720 |
| gaaaaa    | actc  | tggtat      | tttat      | ccctaactgt  | tggggccctac | ctctagtctt | taccgttatc  | 780 |
| aaagagt   | tga   | attataactt  | gccacaagtt | gggttgattg  | gttttgacaa  | tacggagtgg | 840         |     |
| acttgct   | tttt  | cttctccaag  | tgtttcgacg | ctgggttcagc | cctcctttga  | ggaaggacaa | 900         |     |
| caggctaca | a     | agattttgat  | tgaccagatt | gaaggctcgca | atcaagaaga  | aaggcaacaa | 960         |     |
| gtcttg    | gatt  | gtagtg      | tgaa       | ttggaaagag  | tcgactttc   |            | 999         |     |

<210> 16  
 <211> 5301  
 <212> DNA  
 <213> Streptococcus pneumoniae

|            |     |            |            |            |             |            |            |            |      |
|------------|-----|------------|------------|------------|-------------|------------|------------|------------|------|
| <400>      | 16  |            |            |            |             |            |            |            |      |
| atgaataa   | ag  | gattat     | tttga      | aaaacgtt   | gt          | aaatatagta | ttcggaaatt | ttcattaggt | 60   |
| gttgctt    | ctg | ttatgatt   | gg         | agctgcattc | tttgggacaa  | gtccggttct | tg         | cagatagc   | 120  |
| gtgcagt    | ctg | gttccacggc | gaacttacca | gctgatttag | ctactgctct  | tg         | caacagca   |            | 180  |
| aaagaga    | atg | atgggcgtga | ttttgaagcg | cctaagggtg | gagaagacca  | aggttctcca |            |            | 240  |
| gaagttac   | ag  | atggaccta  | gacagaagaa | gaactattag | cacttgaaaa  | agaaaaaccg |            |            | 300  |
| gctgaagaa  | a   | aaccaaaga  | ggataaacct | gcagctgcta | aacctgaaac  | acctaagacg |            |            | 360  |
| gtaaccct   | g   | aatggcaa   | ac         | ggtagcgaat | aaagagcaac  | agggaacagt | cactatccga |            | 420  |
| gaagaaaa   | ag  | gtgtccgcta | caaccaacta | tcctcaactg | ctcaaaatga  | taacgcaggc |            |            | 480  |
| aaaccagcc  |     | tgtttgaaaa | gaagggcttg | accgttgatg | ccaatggaaa  | tgcaactggt |            |            | 540  |
| gatttaac   | ct  | tcaaagatga | ttctgaaaag | ggcaaatac  | gctttggtgt  | ctttttgaaa |            |            | 600  |
| tttaaagata |     | ccaagaataa | tgtttttg   | ct         | ggttatgaca  | aggatggctg | gttctgggag |            | 660  |
| tataaatctc |     | caacaactag | cacttggtat | agaggtagtc | gtgttgctgc  | tcctgaaaca |            |            | 720  |
| ggatcaaca  | a   | accgtctctc | tatcactctc | aagtcagacg | gtcagctaaa  | tgccagcaat |            |            | 780  |
| aatgatgtca |     | atctctttga | cacagtgact | ctaccagctg | cggatcaatga | ccatcttaaa |            |            | 840  |
| aatgagaaga |     | agattcttct | caagggcg   | ggc        | tcttatgacg  | atgagcgaac | agttgttagc |            | 900  |
| gttaaaac   | gg  | ataaccaaga | gggggtaaaa | acagaggata | cccctgctga  | aaaagaaaca |            |            | 960  |
| ggtcctga   | ag  | ttgatgatag | caaggtgact | tatgacacga | ttcagtctaa  | ggtcctcaaa |            |            | 1020 |
| gcagtga    | t   | accaa      | gcctt      | ccctcgtgtc | aaggaataca  | gcttgaacgg | gcatactttg |            | 1080 |
| ccaggacag  | g   | tgcaacagtt | caaccaagtc | tttatcaata | accaccgaat  | caccctgaa  |            |            | 1140 |
| gtcacttata |     | agaaaatcaa | tgagacaaca | gcagagtact | tgatgaagct  | tcgcgatgat |            |            | 1200 |

## 1028462\_1.TXT

|             |             |             |             |            |            |      |
|-------------|-------------|-------------|-------------|------------|------------|------|
| gctcacttaa  | tcaatgcgga  | aatgacagta  | cgcttgcaag  | ttgtagacaa | tcaattgcac | 1260 |
| tttgatgtga  | ctaagattgt  | caaccacaat  | caagtcactc  | caggtcaaaa | gattgatgac | 1320 |
| gaaagcaaac  | tactttcttc  | tattagtttc  | ctcggaatg   | ctttagtctc | tgtttctagt | 1380 |
| aatcaaaactg | gtgctaagtt  | tgatggggca  | accatgtcaa  | acaatacgca | tgtcagcgga | 1440 |
| gatgatcata  | tcgatgtaac  | caatccaatg  | aaggatttgg  | ctaaggggta | catgtatgga | 1500 |
| tttgtttcta  | cagataagct  | tgctgctggt  | gtttggagta  | actctcaaaa | cagctatggt | 1560 |
| ggtggttcga  | atgactggac  | tcgtttgaca  | gcttataaag  | aaacagtcgg | aaatgccaac | 1620 |
| tatgtaggaa  | tccacagctc  | tgaatggcaa  | tgggaaaaag  | cttataaggg | cattgttttc | 1680 |
| ccagaatata  | cgaaggaact  | tccaagtgtc  | aagggttgta  | tactgaaga  | tgccaatgca | 1740 |
| gacaagaacg  | ttgattggca  | agatggtgcc  | attgcttata  | gtagcattat | gaacaatcct | 1800 |
| caaggttggg  | aaaaagttaa  | ggatatcaca  | gcttaccgta  | tcgcatgaa  | ctttggttct | 1860 |
| caagcacaaa  | accatttcct  | tatgaccttg  | gatggtatca  | agaaaatcaa | tctccataca | 1920 |
| gatggtcttg  | ggcaagggtg  | tctccttaaa  | ggatatggta  | gcgaaggcca | tgactctggt | 1980 |
| cacttgaact  | atgctgatata | tggtaaagcg  | atcggtggtg  | tcgaagactt | caagacccta | 2040 |
| attgagaagg  | ctaagaaata  | tggagctcat  | ctaggtatcc  | acgttaacgc | ttcagaaact | 2100 |
| tatcctgagt  | ctaaataactt | caatgaaaaa  | attctccgta  | agaatccaga | tggaagctat | 2160 |
| agctatgggt  | ggaactggct  | agatcaagggt | atcaacattg  | atgctgccta | tgacctagct | 2220 |
| catggtcggt  | tggcacgttg  | ggaagatttg  | aagaaaaaac  | ttggtgacgg | tctcgacttt | 2280 |
| atctatgtgg  | acgtttgggg  | taatggtcaa  | tcagggtgata | acggtgcctg | ggctaccac  | 2340 |
| gttcttgcta  | aagaaattaa  | caaacaaggc  | tggcgctttg  | cgatcgagtg | gggccatggt | 2400 |
| ggtgagtacg  | actctacctt  | ccatcactgg  | gcagctgact  | tgacctacgg | tggctacacc | 2460 |
| aataaaggta  | tcaacagtgc  | catcacccgc  | tttatccgta  | accacaaaaa | agatgcttgg | 2520 |
| gtaggggact  | acagaagtta  | tggtggtgca  | gccaactatc  | cactgctagg | tggctacagc | 2580 |
| atgaaagact  | ttgaaggctg  | gcaggggaaga | agtgactaca  | atggctatgt | aaccaactta | 2640 |
| tttgcccatg  | acgtcatgac  | taagtacttc  | caacacttca  | ctgtaagtaa | atgggaaaat | 2700 |
| ggtacaccgg  | tgactatgac  | cgataacggt  | agcacctata  | aatggactcc | agaaatgcga | 2760 |
| gtggaattgg  | tagatgctga  | caataataaa  | gtagttgtaa  | ctcgtaagtc | aaatgatgtc | 2820 |
| aatagtccac  | aatatcgcg   | acgtacagta  | acgctcaacg  | gacgtgtcat | ccaagatggt | 2880 |
| tcagcttact  | tgactccttg  | gaactgggat  | gcaaattggt  | agaaactttc | tactgataag | 2940 |
| gaaaagatgt  | actacttcaa  | tacgcaggcc  | ggtgcaacaa  | cttggaccct | tccaagcgat | 3000 |
| tgggcaaaga  | gcaaggttta  | cctttacaag  | ctaactgacc  | aaggtaagac | agaagagcaa | 3060 |
| gaactaactg  | taaaagatgg  | taaaattacc  | ctagatcttc  | tagcaaatca | accatacggt | 3120 |

## 1028462\_1.TXT

|            |            |            |            |            |             |      |
|------------|------------|------------|------------|------------|-------------|------|
| ctctatcggt | cgaacaaaac | taatcctgaa | atgtcatgga | gtgaaggcat | gcacatctat  | 3180 |
| gaccaaggat | ttaatagcgg | taccttgaaa | cattggacca | tttcaggcga | tgcttctaag  | 3240 |
| gcagaaattg | tcaagtctca | aggggcaaac | gatatgcttc | gtattcaagg | aaacaaagaa  | 3300 |
| aaagttagtc | tcactcagaa | attaactggc | ttgaaaccaa | ataccaagta | tgccgtttat  | 3360 |
| gttggtgtag | ataaccgtag | taatgccaa  | gcaagtatca | ctgtgaatac | tggtgaaaaa  | 3420 |
| gaagtgacta | cttataccaa | taagtctctc | gcgctcaact | atgttaaggc | ctacgcccac  | 3480 |
| aatacacgtc | gtgacaatgc | tacagttgac | gatacaagtt | acttccaaaa | catgtacgcc  | 3540 |
| ttcttttaca | ctggagcggg | cgtctcaaat | gttactctga | cattgagtcg | tgaagctggg  | 3600 |
| gatcaagcaa | cttactttga | tgaaattcgt | acctttgaaa | acaattcaag | catgtacgga  | 3660 |
| gacaagcatg | atacaggtaa | aggcaccttc | aagcaagact | ttgaaaatgt | tgctcagggt  | 3720 |
| atcttcccat | ttgtagtggg | tggtgtcgaa | ggtgttgaa  | ataaccgcac | tcacttgtct  | 3780 |
| gaaaaacaca | atccatatac | acaacgtggt | tggaatggta | agaaagtcga | tgatgttatc  | 3840 |
| gaaggaaatt | ggctactcaa | gacaaatgga | ctagtgaagg | gtcgtaactt | ggtttaccaa  | 3900 |
| accatccac  | aaaacttccg | ttttgaagca | ggtaagacct | accgtgtaac | ctttgaatac  | 3960 |
| gaagcaggat | cagacaatac | ctatgctttt | gtagtcggta | agggagaatt | ccagtcagggt | 4020 |
| cgctcgtgga | ctcaagcaag | caacttgga  | atgcatgaat | tgccaaatac | ttggacagat  | 4080 |
| tctaagaaag | ccaagaaggc | aaccttcctt | gtgacagggt | cagaaacagg | cgatacttgg  | 4140 |
| gtaggtatct | actcaactgg | aaatgcaagt | aatactcgtg | gtgattctgg | tggaatgcc   | 4200 |
| aacttccgtg | gttataacga | cttcatgatg | gataatcttc | aaatcgaaga | aattacccta  | 4260 |
| acaggtaaga | tggtgacaga | aaatgctctg | aagaactact | tgccaacggg | tgccatgact  | 4320 |
| aactacacca | aagagtctat | ggatgctttg | aaagaggcgg | tctttaacct | cagtcaggcc  | 4380 |
| gatgatgata | tcagtgtgga | agaagcgcgt | gcagagattg | ccaagattga | agctttgaag  | 4440 |
| aatgctttgg | ttcagaagaa | gacggctttg | gtagcagatg | actttgcaag | tcttacagct  | 4500 |
| cctgctcagg | ctcaagaagg | tcttgcaaat | gcctttgatg | gcaatgtgtc | tagtctatgg  | 4560 |
| catacatctt | ggaatggtgg | agatgtaggc | aagcctgcaa | ctatggtctt | gaaagaacca  | 4620 |
| actgaaatca | caggacttcg | ctatgttccg | cgtggatcag | gttcaaattg | taacttgcca  | 4680 |
| gatgtgaaac | ttgttgtgac | agatgagtct | ggcaaggagc | atacctttac | tgcaactgat  | 4740 |
| tgcccaaata | acaacaaacc | aaaagatatt | gactttggta | agacaatcaa | ggctaagaaa  | 4800 |
| attgtcctta | ctggtaccaa | gacatacgga | gatggtggag | ataaatacca | atctgcagcg  | 4860 |
| gaacttatct | ttactcgtcc | acaggtagca | gaaacacctc | ttgacttgtc | aggctatgaa  | 4920 |
| gcagctttgg | ttaaggctca | gaaattaaca | gacaaagaca | atcaagagga | agtagctagc  | 4980 |

1028462\_1.TXT

|   |      |
|---|------|
| gttcaggcaa gcatgaaata tgcgacggat aaccatctct tgacggaaag aatggtggaa | 5040 |
| tactttgcag attatctcaa ccaattaaaa gattctgcta cgaaaccaga tgctccaact | 5100 |
| gtagagaaac ctgagtttaa acttagatct ttagcttccg agcaaggtaa gacgccagat | 5160 |
| tataagcaag aaatagctag accagaaaca cctgaacaaa tcttgccagc aacaggtgag | 5220 |
| agtcaatctg acacagccct catcctagca agtgttagtc tagccctatc tgctctcttt | 5280 |
| gtagtaaaaa cgaagaaaga c   | 5301 |

<210> 17  
 <211> 2157  
 <212> DNA  
 <213> Streptococcus pneumoniae

|   |      |
|---|------|
| <400> 17  |      |
| atgaacaaac caacgattct ggcgctaatac aagtatctga gcattagctt cttagcttg | 60   |
| gttatcgag ccattgtctt aggcggagga gtttttttct actacgttag caaggctcct  | 120  |
| agcctatccg agagtaaact agttgcaaca acttctagta aaatctacga caataaaaat | 180  |
| caactcattg ctgacttggg ttctgaacgc cgcgtcaatg cccaagctaa tgatattccc | 240  |
| acagatttgg ttaaggcaat cgtttctatc gaagaccatc gcttcttcga ccacaggggg | 300  |
| attgatacca tccgtatcct gggagctttc ttgcgcaatc tgcaaagcaa ttcctccaa  | 360  |
| ggtggatcaa ctctcacca acagttgatt aagttgactt acttttcaac ttcgacttcc  | 420  |
| gaccagacta tttctcgtaa ggctcaggaa gcttggttag cgattcagtt agaacaaaaa | 480  |
| gcaaccaagc aagaatctt gacctactat ataaataagg tctacatgtc taatgggaac  | 540  |
| tatggaatgc agacagcagc tcaaaactac tatggtaaag acctcaataa tttagttta  | 600  |
| cctcagttag ccttgctggc tggaatgcct caggcaccaa accaatatga cccctattca | 660  |
| catccagaag cagcccaaga ccgccgaaac ttggtcttat ctgaaatgaa aaatcaaggc | 720  |
| tacatctctg ctgaacagta tgagaaagca gtcaatacac caattactga tggactacaa | 780  |
| agttctcaat cagcaagtaa ttaccctgct tacatggata attacctcaa ggaagtcac  | 840  |
| aatcaagttg aagaagaaac aggctataac ctactcaca ctgggatgga tgtctacaca  | 900  |
| aatgtagacc aagaagctca aaaacatctg tgggatattt acaatacaga cgaatacggt | 960  |
| gcctatccag acgatgaatt gcaagtcgct tctaccattg ttgatgtttc taacggtaaa | 1020 |
| gtcattgccc agctaggagc acgccatcag tcaagtaatg tttccttcgg aattaaccaa | 1080 |
| gcagtagaaa caaacgcga ctggggatca actatgaaac cgatcacaga ctatgctcct  | 1140 |
| gccttggagt acggtgtcta cgattcaact gctactatcg ttcacgatga gccctataac | 1200 |
| taccctggga caaatactcc tgtttataac tgggataggg gctactttgg caacatcacc | 1260 |
| ttgcaatacg ccctgcaaca atcgcgaaac gtcccagccg tggaaactct aaacaaggtc | 1320 |

1028462\_1.TXT

|  |      |
|--|------|
| ggactcaacc gcgccaagac tttcctaaat ggtctaggaa tcgactaccc aagtattcac  | 1380 |
| tactcaaatg ccatttcaag taacacaacc gaatcagaca aaaaatatgg agcaagtagt  | 1440 |
| gaaaagatgg ctgctgctta cgctgccttt gcaaattggtg gaacttacta taaaccaatg | 1500 |
| tatatccata aagtcgtctt tagtgatggg agtgaaaaag agttctctaa tgtcggaaact | 1560 |
| cgtgccatga aggaaacgac agcctatatg atgaccgaca tgatgaaaac agtcttgact  | 1620 |
| tatggaactg gacgaaatgc ctatcttgct tggctccctc aggctggtaa aacaggaacc  | 1680 |
| tctaactata cagacgagga aattgaaaac cacatcaaga cctctcaatt tgtagcacct  | 1740 |
| gatgaactat ttgctggcta tacgcgtaaa tattcaatgg ctgtatggac aggctattct  | 1800 |
| aaccgtctga caccacttgt aggcaatggc cttacggctg ctgccaaagt ttaccgctct  | 1860 |
| atgatgacct acctgtctga aggaagcaat ccagaagatt ggaatatacc agaggggctc  | 1920 |
| tacagaaatg gagaattcgt atttaaaaat ggtgctcggt ctacgtggaa ctcacctgct  | 1980 |
| ccacaacaac ccccatcaac tgaaagttca agctcatcat cagatagttc aacttcacag  | 2040 |
| tctagctcaa ccactccaag cacaataat agtacgacta ccaatcctaa caataatacg   | 2100 |
| caacaatcaa atacaacccc tgatcaacaa aatcagaatc ctcaaccagc acaacca     | 2157 |

<210> 18  
 <211> 1392  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |     |
|--|-----|
| <400> 18   |     |
| atgagtaaaa aaagacgaaa tcgtcataaa aaagaagggtc aagaaccgca atttgatttt | 60  |
| gatgaagcaa aagagctaac agttggtcaa gctattcgta aaaatgaaga agtggaatca  | 120 |
| ggagtccttg ctaggattc cattttggac aagtatgtta agcaacacag agatgaaatt   | 180 |
| gaggcggata agtttgcgac tcgtcaatac aaaaaagagg agttcgttga aactcagagt  | 240 |
| ctggatgatt taattcaaga gatgcgtgag gctgtagaga agtcagaagc ttcttcggag  | 300 |
| gaagttccat cttctgaaga catcttacta cccttgctc tggacgatga ggagcaaggc   | 360 |
| ttggatcctc tattgctaga tgatgaaaat ccaacagaaa tgactgaaga agtggaagag  | 420 |
| gagcaaaacc tttctcgtct ggatcaagag gactcagaaa agaaaagtaa aaaaggcttt  | 480 |
| attttgaccg ttttggcgct tgtatcagta attatttgtg tcagtgttta ttatgtctac  | 540 |
| cgtcaagtgg ctcgttcgac taaggaaatt gaaacttctc aatcaactac agccaatcaa  | 600 |
| tcggatgtgg atgattttta tacactttat gacgcctttt acacagatag caataaaacg  | 660 |
| gctttgaaaa atagccagtt tgataaactg agtcaactca agactttact tgataagctg  | 720 |
| gaaggtagtc gtgaacatac gcttgccaaa tctaaatatg atagtctagc aacgcaaadc  | 780 |
| aaggctattc aagatgtcaa tgctcaattt gagaaaccag ctattgtgga tgggtgtgtg  | 840 |

1028462\_1.TXT

|   |      |
|---|------|
| gataccaatg ccaaagccaa atcggatgct aaattttacgg atatttaa             | 900  |
| gagcttgata aagtgctaga taaggctatc agtcttggtg agagccagca aacaagtact | 960  |
| tctagctcaa gttcaagtca aactagcagc tcaagttcaa gtcaagcaag ttcaaatacg | 1020 |
| actagtgagc caaaaccaag tagttcaa                                    | 1080 |
| atgggtctct cgagtgcagg ggttgctggt caaagaagtg ccagtcgtgt tgcctataat | 1140 |
| cagtctgcta ttgatgatag taataactct gcctgggatt ttg                   | 1200 |
| caaattctag cgacttcacg ttcacgtggc tatatcactg gagaccaata t          | 1260 |
| cgtgtcaata tcgttaacgg caatgggttat tacaacctct acaagccaga           | 1320 |
| ctctttaccc ttaactgtaa gacaggctac tttgtcggaa atggcgctgg            | 1380 |
| gacttagatt ac   | 1392 |

<210> 19  
 <211> 1020  
 <212> DNA  
 <213> Streptococcus pneumoniae

|   |      |
|---|------|
| <400> 19<br>atgaagcttt tgaaaaaat gatgcaagtc gcattagcag tctttttctt | 60   |
| gctacaaata cggtatttgc gaataccaca ggtggccgat ttgttgataa            | 120  |
| aaatattatg taaaagatga tcataaagca atctattggc ataaaataga            | 180  |
| tactattttg gtgatattgg agagatgggt gtcggttggc aatacttaga            | 240  |
| acaggttatc gtgataat   | 300  |
| aagtgggtact attttggaca agatgggtgct ttgctagaac aaacagataa          | 360  |
| gaggcaaaaa cgtctgaaaa tacaggaaaa gtatacgggtg aacaatatcc           | 420  |
| gaaaagagaa cttattat   | 480  |
| gagggtcatt ggtattat   | 540  |
| ctaccaattg gtgaagttgc taaggggttg actcaagatt ttcattgtac            | 600  |
| gatagaagca aacctgctcc atgggtactac ctagatgctt caggtaagat           | 660  |
| tggaacaaag taaacggaaa atgggtattat tttggctcct ctggttctat           | 720  |
| tggaatatg tacgaggcaa atgggtattac ttagataata aaaatgggtga           | 780  |
| ggatggcaat accttggtaa caagtgggtac tacctccggt catcaggagc           | 840  |
| ggctgggtatc aagatgggtc aacttgggtac tatttagatc cttcta              | 900  |
| ataggttgga caaaagtaaa tggaaaatgg tattatctca attcaa                | 960  |
| acaggtagcc aaactatcga tggtaaagtt tataatttcg cctcatctgg            | 1020 |

<210> 20



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<211> 996  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 20  
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 gggaccagta cagtatttgc agatgattct gaaggatggc agtttgtcca agaaaacgga 120  
 agaacctact acaaaaaggg ggacctcaaa gaaacctact ggcgagtgat tgatggtaag 180  
 tactattatt ttgattctct atctggagag atggttgtcg gctggcaata tatcccgttt 240  
 ccatctaaag gtagtacaat tggtccttac ccaaattggt tcagattaga aggttttcca 300  
 aagtcagagt ggtactactt cgataaaaat ggagtgttac aagagtttgt tggtttgaaa 360  
 acattagaga ttaaaactaa agacagtgtt ggaagaaagt acggggaaaa acgtgaagat 420  
 tcagaagata aagaagagaa gcgttattat acgaactatt actttaatca aaatcattct 480  
 ttagagacag gttggcttta tgatcagtct aactgggtatt atctagctaa gacggaaatt 540  
 aatggagaaa actaccttgg tggtgaaaga cgtgcggggt ggataaacga tgattcgact 600  
 tgggtactacc tagatccaac aactgggtatt atgcaaacag gttggcaata tctaggtaat 660  
 aagtgggtact acctccgttc ctcaggagca atggccactg gctgggtatca ggaagggtacc 720  
 acttgggtatt atttagacca ccaaattggc gatatgaaaa caggttggca aaaccttggg 780  
 aacaaatggt actatctccg ttcacagga gctatggcaa ctggttggt tcaagatggt 840  
 tcaacttgggt actacctaaa tgcaggtaat ggagacatga agacagggtt gttccagggtc 900  
 aatggcaact ggtactatgc ttatagctca ggtgctttgg cagtgaatac gaccgtagat 960  
 ggctattctg tcaactataa tggcgaatgg gttcgg 996

<210> 21  
 <211> 855  
 <212> DNA  
 <213> Streptococcus pneumoniae

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 tatgggaaag aagcggatga ttttatgtt cttccggctg ttagtccaag tcaagaacca 180  
 tttggaaaga tcaaagtaaa ggaagtctgt ttttgaagg aatttagaaa tttaaattct 240  
 aaggatgcaa gggaatatga cttggcttta ttaattctag aagagcccat tgggtgcaaaa 300  
 ttagggactt tgggtcttcc tactagtcaa aaaaatttga caggaataac tgtgactatc 360  
 acaggctatc catcatataa ttttaaaatt catcaaattg atacagataa aaaacaagtt 420  
 ttaagtgatg atggcatgtt cttggattac caagttgata ctttagaggg gtctagtgga 480  
 tctacagttt atgatgctag tcaccgtgta gtaggagtgc atactttagg agatggagct 540

1028462\_1.TXT

|   |     |
|---|-----|
| aatcaaatta acagtgcagt taaattaaat gaacgaaatt tgccatttat ttattcggtt   | 600 |
| cttaaagggtt actctcttga aggatggaag aaaataaatg gtagttggta ccattataga  | 660 |
| caacatgata aacaaacggg ttggcaggag ataaatgata cttggtatta tttagacagt   | 720 |
| tccggtgaaga tgcttacaga ttggcaaaaa gtaaattggaa aatggtatta tctcaattca | 780 |
| aatggagcaa tggttacagg tagccaaact atcgatggta aagtttataa cttcgcttca   | 840 |
| tctggtgagt ggatt  | 855 |

<210> 22  
 <211> 1890  
 <212> DNA  
 <213> Streptococcus pneumoniae

|   |      |
|---|------|
| <400> 22  |      |
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| gtttttgcca ttgatttcaa gataaactct tatcaagggg atttgtatat tcatgcagac   | 120  |
| aatacggcag agtttagaca gaagatagtt taccagtttg aggaggactt taagggccaa   | 180  |
| atcgtgggac ttggacgtgc tggtaatgat cctagcgggt ttgacattga ccctcatcca   | 240  |
| aagattcagg cgcgaaaaaa cgggtgcagaa ctacgagatg tgactagcga agtaacagaa  | 300  |
| gaagcggatg gttatactgt gagagtctat aatccagggtc aggagggcga catagttgaa  | 360  |
| gttgacctcg tctggaactt aaaaaattta cttttccttt atgatgatat cgctgaatta   | 420  |
| aattggcaac ctctgacaga tagttcagag tctattgaaa agtttgaatt tcatgtaagg   | 480  |
| ggagacaagg gggctgaaaa actctttttc catacaggga aacttttttag agagggaaacg | 540  |
| attgaaaaga gtaaccttga ttatactatc cgtttagaca atcttccggc taagcgtgga   | 600  |
| gttgagttgc atgcctattg gcctcggacc gattttgcta gcgctaggga tcagggattg   | 660  |
| aaagggaaatc gtttagaaga gtttaataag atagaagact cgattgttag agaaaaagat  | 720  |
| cagagtaaac aactcgttac ttgggtcctc ccttcgatcc tttccatctc cttgttattg   | 780  |
| agtgtctgct tctattttat ttatagaaga aagaccactc cttcagtcaa atatgccaaa   | 840  |
| aatcatcgtc tctatgaacc accaatggaa ttagagccta tggttttatc agaagcagtc   | 900  |
| tactcgacct ccttgaggga agtgagtccc ttggtcaagg gagctggaaa attcaccttt   | 960  |
| gatcaactta ttcaagctac cttgctagat gtgatagacc gtgggaatgt ctctatcatt   | 1020 |
| tcagaaggag atgcagttgg tttgaggcta gtaaaagaag atggtttgtc aagctttgag   | 1080 |
| aaagactgcc taaatctagc tttttcaggt aaaaaagaag aaactctttc caatttgttt   | 1140 |
| gcggattaca aggtatctga tagtctttat cgtagagcca aagtttctga tgaaaaacgg   | 1200 |
| attcaagcaa gagggcttca actcaaatct tcttttgaag aggtattgaa ccagatgcaa   | 1260 |
| gaaggagtga gaaaacgagt ttccttctgg gggctcccag attattatcg tcctttaact   | 1320 |

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ggtggggaaa aggccttgca agtgggtatg ggtgccttga ctatcctgcc cctatttatc 1380  
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 atacttggtt ttctaggggt agttttgtct gttttctatt attggaagct tgcactagat 1500  
 aatcgtgatg gtgttctaaa tgaagcggga gctgaggtct actatctctg gaccagtttt 1560  
 gaaaatatgt tgcgtgagat tgcacgattg gatcaggctg aactggaaag tattgtggtc 1620  
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 tggcacagta cgttttatca ttcaacagca caaatgagcc attatgctag tgtcgcaaatt 1800  
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 ggcggaggtg gcggcagtat cggtgccttt 1890

<210> 23  
 <211> 1995  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 23  
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 aaactatttg caacagatgg ggatatggat aaaattgcaa atgagttaga aacaggtaac 180  
 tatgctggta ataaagtggg tggtctacct gcaaattgcaa aagaaattgc cgggtgttatg 240  
 ttcgtttgga caaatactaa taatgaaatt attgatgaaa atggccaaac tctaggagtg 300  
 aatattgatc cacaaacatt taaactctca ggggcaatgc cggcaactgc aatgaaaaaa 360  
 ttaacagaag ctgaaggagc taaatttaac acggcaaat taccagctgc taagtataaa 420  
 atttatgaaa ttcacagttt atcaacttat gtcggtgaag atggagcaac cttaacaggt 480  
 tctaaagcag ttccaattga aattgaatta ccattgaacg atgttggtgga tgcgcatgtg 540  
 tatccaaaaa atacagaagc aaagccaaaa attgataaag atttcaaagg taaagcaaatt 600  
 ccagatacac cacgtgtaga taaagataca cctgtgaacc accaagttgg agatgttgta 660  
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 gatagaatga ctgaagggtt ggcatccaac aaagggtacag tgaaagtaac tgttgatgat 780  
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 acttattcgg caacattgaa tgacaaagca attgtagaag taccagaatc taatgatgta 960  
 acatttaact atggtaataa tccagatcac ggggaatactc caaagccgaa taagccaaat 1020  
 gaaaacggcg atttgacatt gaccaagaca tgggttgatg ctacaggtgc accaattccg 1080

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 tataaattcg ttgaacgtag tataaaaggg tattcagcag attatcaaga aatcactaca 1260  
 gctggagaaa ttgctgtcaa gaactggaaa gacgaaaatc caaaaccact tgatccaaca 1320  
 gagccaaaag ttgttacata tggtaaaaag tttgtcaaag ttaatgataa agataatcgt 1380  
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 gatagagcag ttgctgctta taacgctctt actgcacaac aacaaactca gcaagaaaaa 1560  
 gagaaagtgt acaaagctca agctgcttat aatgctgctg tgattgctgc caacaatgca 1620  
 tttgaatggg tggcagataa ggacaatgaa aatgttgtga aattagtttc tgatgcacaa 1680  
 ggtcgctttg aaattacagg ctttcttgca ggtacatatt acttagaaga aacaaaacag 1740  
 cctgctgggt atgcattact aactagccgt cagaaatttg aagtcactgc aacttcttat 1800  
 tcagcgactg gacaaggcat tgagtatact gctgggtcag gtaaagatga cgctacaaaa 1860  
 gtagtcaaca aaaaaatcac tatcccacaa acgggtggta ttggtacaat tatctttgct 1920  
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 gaggatcaac ttgct 1995

<210> 24  
 <211> 837  
 <212> DNA  
 <213> Streptococcus pneumoniae

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 caaattgctg actttgataa ggaaaaagca acgttggatg aggctgacat tgatgaacga 120  
 atgaaattgg cacaagcctt caatgactct ttgaataatg tagtgagtgg cgatccttgg 180  
 tcggaagaaa tgaagaaaaa agggcgagca gagtatgcac gtatgttaga aatccatgag 240  
 cggatggggc atgtggaaat ccccgttatt gacgtggatt tgccggttta tgctggtact 300  
 gctgaagagg tattgcagca aggggctggg catctagagg gaacttctct gccgatcgga 360  
 ggcaattcga cccatgcggt gattacggca catacagggt tgccaacagc taagatgttt 420  
 acggatttga ccaaacttaa agttggggat aagttttatg tgcacaatat caaggaagtg 480  
 atggcctatc aagtggatca agtaaagggt attgagccga cgaactttga tgattttattg 540  
 attgtaccag gtcattgatta tgtgaccttg ctgacttgta cgccatacat gatcaatacc 600  
 catcgtctat tggttcgggg gcacgcgata ccgtacgtag cagagggtga ggaagaattt 660  
 attgcagcaa acaaactcag tcatctctat cgctacctgt tttatgtggc agttgggtttg 720

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attgtgattc ttttatggat tattcgacgc ttgcgcaaga agaaaaaaca accggaaaag 780  
gctttgaagg cgctgaaagc agcaaggaag gaagtgaagg tggaggatgg acaacag 837

<210> 25  
<211> 849  
<212> DNA  
<213> Streptococcus pneumoniae

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attcctatatt attgttttgg acagatggtg ttgcagtctc ttggacaggt gaaaggatcat 120  
gctacatttg tgaaatccat gacaactgaa atgtaccaag aacaacagaa ccattctctc 180  
gcctacaatc aacgcttggc ttcgcaaaat cgcattgtag atcctttttt ggcgaggaggga 240  
tatgaggtca attaccaagt gtctgacgac cctgatgcag tctatggtta cttgtctatt 300  
ccaagtttgg aaatcatgga gccggtttat ttgggagcag attatcatca tttagggatg 360  
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gttggagatg ctctttatta tgataatggc caggaaattg tagaatatca gatgatggac 540  
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gaacgagtcg ctgtttatca aaaatcagat ccacaaacag ctgcagttgc gaggggttgct 720  
tttacgaaag aaggacaatc tgtatcgctg gttgcaacct ctcaatgggt gtaccgtggg 780  
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cgagggaaa 849

<210> 26  
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gcagttcctg aaaatagcgg agctaataca gagcttgttt caggagagag tgagcattcg 180  
accaatgaag ctgataagca gaatgaaggg gaacatgcta gagaaaacaa gctagaaaag 240  
gcagaaggag tagcgatagc atctgaaact gcttcgccag caagcaatga agctgcaact 300  
actgaaactg cagaagcagc tagcgcagct aaaccagagg aaaaagcaag tgaggtgggt 360  
gcagaaacac catctgcaga agcaaaacct aagtctgaca aggaaacaga agcaaagccc 420

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|            |            |            |             |             |            |      |
|------------|------------|------------|-------------|-------------|------------|------|
| gaagcaacta | accaagggga | tgagtctaaa | ccagcagcag  | aagctaataa  | gactgaaaaa | 480  |
| gaagtccagc | cagatgtccc | taaaaataca | gaaaaaacat  | taaaaccaa   | ggaaatcaaa | 540  |
| tttaattctt | gggaagaatt | gttaaaatgg | gaaccaggtg  | ctcgtgaaga  | tgatgctatt | 600  |
| aaccgcggat | ctgttgtcct | cgcttcacgt | cggacaggtc  | atttagtcaa  | tgaaaaagct | 660  |
| agcaaggaag | caaaagttca | agccttatca | aacaccaatt  | ctaaagcaa   | agaccatgct | 720  |
| tctgttggtg | gagaagagtt | caaggcctat | gcttttgact  | attggcaata  | tctagattca | 780  |
| atggtcttct | gggaaggtct | cgtaccaact | cctgacgtta  | ttgatgcagg  | tcaccgtaac | 840  |
| ggggttcctg | tatacggtag | actcttcttc | aactgggtcta | atagtattgc  | agatcaagaa | 900  |
| agatttgctg | aagctttgaa | gcaagacgca | gatggtagct  | tcccaattgc  | ccgtaaattg | 960  |
| gtagacatgg | ccaagtatta | tggctatgat | ggctatttca  | tcaaccaaga  | aacaactgga | 1020 |
| gatttggtta | aacctcttgg | agaaaagatg | cgccagttta  | tgctctatag  | caaggaatat | 1080 |
| gctgctaagg | taaaccatcc | aatcaagtat | tcttggtacg  | atgccatgac  | ctataactat | 1140 |
| ggacgttatc | atcaagatgg | tttgggagaa | tacaactacc  | aattcatgca  | accagaagga | 1200 |
| gataaggttc | cggcagataa | cttctttgct | aactttaact  | gggataaggc  | taaaaatgat | 1260 |
| tacactattg | caactgccaa | ctggattggt | cgtaatcctt  | atgatgtatt  | tgcaggtttg | 1320 |
| gaattgcaac | aggggtggtt | ctacaagaca | aagggttaagt | ggaatgacat  | tttagacgaa | 1380 |
| aatgggaaat | tgcgcccttc | tcttggttta | tttgccccag  | ataccattac  | aagtttagga | 1440 |
| aaaactgggt | aagattatca | taaaaatgaa | gatatcttct  | ttacagggtta | tcaaggagac | 1500 |
| cctactggcc | aaaaaccagg | tgacaaagat | tggtaggtta  | ttgctaacct  | agttgcggac | 1560 |
| cgtacgccag | cggtaggtaa | tacttttact | acttctttta  | atacagggtca | tggtaaaaaa | 1620 |
| tggttcgtag | atggtaaggt | ttctaaggat | tctgagtgga  | attatcgttc  | agtatcaggt | 1680 |
| gttcttccaa | catggcgctg | gtggcagact | tcaacagggg  | aaaaacttcg  | tgcagaatat | 1740 |
| gattttacag | atgcctataa | tggcggaaat | tcccttaa    | tctctggtga  | tgtagccggt | 1800 |
| aagacagatc | aggatgtgag | actttattct | actaagttag  | aagtaactga  | gaagaccaa  | 1860 |
| cttcgtgttg | cccacaagg  | aggaaaagg  | tctaaagttt  | atatggcatt  | ctctacaact | 1920 |
| ccagactaca | aattcgatga | tgcagatgca | tggaaagagc  | taaccctttc  | tgacaactgg | 1980 |
| acaaatgaag | aatttgatct | tagctcacta | gcgggtaaaa  | ccatctatgc  | agtcaaacta | 2040 |
| tttttcgagc | atgaaggtgc | tgtaaaagat | tatcagttta  | acctaggaca  | attaactatc | 2100 |
| tcggacaatc | accaagagcc | acaatcgccg | acaagctttt  | ctgtagtgaa  | acaatctctt | 2160 |
| aaaaatgccc | aagaagcgga | agcagttgtg | caatttaaag  | gcaacaagga  | tgcagatttc | 2220 |
| tatgaagttt | atgaaaaaga | tggagacagc | tggaaattac  | taactggctc  | atcttctaca | 2280 |
| actatttatc | taccaaaggt | tagccgctca | gcaagtgtc   | agggtacaac  | tcaagaactg | 2340 |

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|            |             |             |             |             |            |      |
|------------|-------------|-------------|-------------|-------------|------------|------|
| aaggtttag  | cagtcggtaa  | aaatggagtt  | cgttcagaag  | ctgcaaccac  | aacctttgat | 2400 |
| tggggtatga | ctgtaaaaga  | taccagccta  | ccaaaaccac  | tagctgaaaa  | tatcgttcca | 2460 |
| ggtgcaacag | ttattgatag  | tactttccct  | aagactgaag  | gtggagaagg  | tattgaaggt | 2520 |
| atgttgaacg | gtaccattac  | tagcttgtca  | gataaatggt  | cttcagctca  | gttgagtgg  | 2580 |
| agtgtggata | ttcgtttgac  | caagccacgt  | accgttggtta | gatgggtcat  | ggatcatgca | 2640 |
| ggagctggtg | gtgagtcctgt | taacgatggc  | ttgatgaaca  | ctaaagactt  | tgacctttat | 2700 |
| tataaagatg | cagatggtga  | gtggaagcta  | gctaaggaag  | tccgtggtaa  | caaagcacac | 2760 |
| gtgacagata | tcactcttga  | taaaccaatc  | actgctcaag  | actggcgctt  | gaatgttgtc | 2820 |
| acttctgaca | atggaactcc  | atggaaggct  | attcgtatct  | ataactggaa  | aatgtatgaa | 2880 |
| aagcttgata | ctgagagtgt  | caatattccg  | atggccaagg  | ctgcagcccg  | ttctctaggc | 2940 |
| aataacaagg | tacaagttgg  | ctttgcagat  | gtaccggctg  | gagcaactat  | taccgtttat | 3000 |
| gataatccaa | attctcaaac  | tccgctcgca  | accttgaaga  | gcgaagttgg  | aggagaccta | 3060 |
| gcaagtgcac | cattggattt  | gacaaatcaa  | tctggtcttc  | tttattatcg  | taccagttg  | 3120 |
| ccaggcaagg | aaattagtaa  | tgtcctagca  | gtttccgttc  | caaagatga   | cagaagaatc | 3180 |
| aagtcagtca | gcctagaaac  | aggacctaag  | aaaacaagct  | acgccgaagg  | ggaggatttg | 3240 |
| gaccttagag | gtggtgttct  | tcgagttcag  | tatgaaggag  | gaactgagga  | cgaactcatt | 3300 |
| cgcctaactc | acgcaggtgt  | atcagtatca  | ggttttgata  | cgcatacataa | gggagaacag | 3360 |
| aatcttactc | tccaatattt  | gggacaaccg  | gtaaatgcta  | atttgtcagt  | gactgtcact | 3420 |
| ggccaagacg | aagcaagtcc  | gaaaactatt  | ttgggaattg  | aagtaagtca  | ggaaccgaaa | 3480 |
| aaagattacc | tagttggtga  | tagcttagac  | ttgtctgaag  | gacgctttgc  | agtggcttat | 3540 |
| agcaatgaca | ccatggaaga  | acattccttt  | actgatgagg  | gagttgaaat  | ttctggttac | 3600 |
| gatgctcaaa | agactggctg  | tcaaaccctg  | acgcttcatt  | accaaggcca  | tgaagttagc | 3660 |
| tttgatgttt | tggtatctcc  | aaaagcagca  | ttgaacgatg  | agtacctcaa  | acaaaaatta | 3720 |
| gcagaagttg | aagctgctaa  | gaacaagggtg | gtctataact  | ttgcttcatac | agaagtaaaa | 3780 |
| gaagccttct | tgaaagcaat  | tgaagcggcc  | gaacaagtgt  | tgaaagacca  | tgaaactagc | 3840 |
| accaagatc  | aagtcaatga  | ccgacttaat  | aaattgacag  | aagctcataa  | agctctgaat | 3900 |
| ggtcaagaga | aatttacgga  | agaaaagaca  | gagcttgatc  | gcttaacagg  | tgaggttcaa | 3960 |
| gaactcttgg | ctgccaaacc  | aaaccatcct  | tcaggttctg  | ccctagctcc  | gcttcttgag | 4020 |
| aaaaacaagg | ccttggttga  | aaaagtagat  | ttgagtccag  | aagagcttac  | aacagcgaaa | 4080 |
| cagagtctaa | aagatctgg   | tgctttattg  | aaagaagaca  | agccagcagt  | cttttctgat | 4140 |
| agtaaaacag | gtgttgaagt  | acacttctca  | aataaagaga  | agactgtcat  | caagggtttg | 4200 |

## 1028462\_1.TXT

```

aaagtagagc gtgttcaagc aagtgtgtaa gagaagaaat actttgctgg agaagatgct 4260
catgtctttg aaatagaagg tttggatgaa aaaggtcaag atgttgatct ctcttatgct 4320
tctattgtga aaatcccaat tgaaaaagat aagaaagtta agaaagtatt tttcttacct 4380
gaaggcaaag aggcagtaga attggctttt gaacaaacgg atagtcatgt tatctttaca 4440
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aaacaattgc caaatacagg aacagctgat gctaataag ccctaatagc aggcttagcc 4920
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```

&lt;210&gt; 27

&lt;211&gt; 1461

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 27

```

atgtcaatta catcatttgt aaaaagaatt caagatatca ctcgaaacga tgctgggtgtt 60
aatggtgatg ctcaacgtat tgagcaaatg tcttggttat tattcttaaa aatttatgat 120
agccgtgaaa tggtttgga attagaagaa gacgagtatg agtcaattat cccagaggaa 180
ttaaaatggc gaaattgggc tcatgctcaa aatggggaac gggatttgac aggcgatgaa 240
ttacttgatt ttgtcaataa caagttattc aaagagttga aagagcttga aataacttca 300
aatatgccta ttcgaaaaac gattgttaaa tcagcttttg aagatgcgaa caactatatg 360
aaaaatggcg tcttgttacg ccaagtcatc aatgttattg atgaagttga tttcaatagc 420
cctgaagatc gtcattcgtt taatgatatt tacgaaaaaa ttcttaaaga tattcaaaat 480
gctgggaact caggagaatt ttatacgcca cgtgcagcga ctgattttat tgccgaagtt 540
cttgacccaa aacttggaga atcaatggca gaccttgctt gcggaacagg aggcttcttg 600
acttcgactc tgaaccgttt aagtagtcaa cgtaaaacta gtgaagatac caaaaaatat 660
aatacagctg tttttggtat tgaaaagaaa gcatttcctc atcttttagc agttacaaat 720
ctgtttcttc acgaaattga tgaccctaaa attgttcatg gaaatacttt ggagaaaaat 780
gttcgtgaat atacggatga tgaaaaattht gacattatta tgatgaatcc accttttgga 840
gggtcagaat tagaaacaat aaaaaataac tttccagcag aattacggag ttctgaaaca 900

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## 1028462\_1.TXT

gctgatttat ttatggctgt cattatgtat cgtttgaaag aaaatgggtcg tgttggagtt 960  
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 gtagatgagt tcaacttgca tacgattatt aggttgccctc atagtgtctt tgcaccgtat 1080  
 acaggaatcc atacgaacat tcttttcttt gataaaacaa agaaaacaga agaaacttgg 1140  
 ttttatcgtt tagatatgcc agatgggttat aaaaatttct cgaaaactaa gccgatgaag 1200  
 tcagaacact tcaatcctgt tcgtgactgg tgggaaaatc gtgaagagat tctggaaggt 1260  
 aagttctaca aatctaaatc atttacacct agtgaattgg ctgagttgaa ttataattta 1320  
 gaccagtgtg actttccaaa agaggaagag gaaatcttaa atccctttga gttgattcag 1380  
 aattatcaag cggaagagc aactttaaat cataagattg ataatgtatt agctgatatt 1440  
 ttgcagttgt tggaggacaa a 1461

<210> 28  
 <211> 1134  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 28  
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 ggtgctgagg acaagtacaa ggaagttcaa gaagcctatg agactttgag tgacgaccaa 180  
 aaacgtgctg cctatgacca gtatggtgct gcaggcgcca atggtggttt tgggtggagct 240  
 ggtgggtttcg gcggtttcaa tggggcaggt ggcttcggtg gttttgagga tattttctca 300  
 agtttcttcg gcggaggcgg ttcttcgcgc aatccaaacg ctcttcgcca aggagatgat 360  
 ctccagtatc gtgtcaatth gacctttgaa gaagctatct tcggaactga gaaggaagtt 420  
 aagtatcatc gtgaagctgg ctgtcgtaca tgtaatggat ctggtgctaa gccagggaca 480  
 agtccagtca cttgtggacg ctgtcatggc gctggtgtca ttaacgtcga tacgcagact 540  
 cctcttggtg tgatgcgtcg ccaagtaacc tgtgatgtct gtcacggtcg aggaaaagaa 600  
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 catgtgaaaa tccctgctgg tgtggaaaca ggtcaacaaa ttcgcctcgc tgggtcaaggt 720  
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 attccagagg gaactcagac tggtaagaag ttccgcctac gtagtaaggg ggcaccgagc 960  
 cttcgtggcg gtgcagttgg tgaccaatac gttactgtta atgtcgtaac accgacaggc 1020  
 ttgaacgacc gccaaaaagt agccttgaaa gaattcgcgg ctgctggtga cttgaaagta 1080

aatccaaaga aaaaaggctt ctttgacat attaaagatg ctttgatgg agaa 1134

<210> 29  
 <211> 1359  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 29  
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 gccacaaaag aaattactgt tacttcccaa ggagaaatcg cccctacaag tgtcattgcc 180  
 tccattcagt caaccagtga taatcctatc ctagctaatc atttagtggc aaatcaagta 240  
 gttgaaaaag gggacttact catcaaatac tctgaaacaa tggaagaaag tcagaaaact 300  
 gccttagcaa ctcaattaca aagacttgag aagcaaaaag aaggacttgg aattttgaaa 360  
 caaagcttag aaaaagcgac tgatcttttt tctggcgagg atgaatttgg ctaccataat 420  
 acctttatga attttactaa acaatcccat gatattgaac tgggtatcac aaagactaac 480  
 accgaagttt caaatcaagc taatctttcc aatagcagtt catcagctat tgaacaagaa 540  
 attacaaaag ttcaacaaca aattggagaa tatcaagagt tgagagatgc tatcataaat 600  
 aacagagcac gcttaccaac tggcaatccg caccagtcaa ttttgaatcg ttatcttgta 660  
 gcctcacaag gacaaacaca aggaactgca gaggagccat ttttatctca aattaatcaa 720  
 agtattgcag gtcttgaatc atctatcgca agcctcaaaa ttcagcaagc tgggtatcgga 780  
 agtgtagcaa cttatgataa cagtttagca accaaaattg aagtactccg cactcagttt 840  
 ttacagacag cctcacagca acaactaact gtggagaatc aattaacaga attaaaagta 900  
 caactagatc aagccacaca gcgtttggaa aacaatacct taacctcccc aagtaaaggt 960  
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 gctcaaatat tccctgtcat cacagatata agagaagtac taatcactta ctacgtatct 1080  
 tctgactatc tacctctact agataaagga caaactgtaa gattaaaact ggagaagatt 1140  
 ggaaatcacg gcaccacat catcggccaa cttcagacaa ttgatcaaac tcctaccaga 1200  
 acagagcaag gaaatctctt taaattaacc gctcttgcaa aactatctaa cgaggatagt 1260  
 aaactcatcc aatatggctt acaaggctgc gtcactagtg taactacaaa gaaaacatat 1320  
 tttgattatt tcaaagataa aattttaaca cattctgat 1359

<210> 30  
 <211> 393  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 30  
 atgtcaaaga aactcaatcg taaaaaacia ttacgaaatg gcctccgtcg cgcaggtgcc 60

## 1028462\_1.TXT

|  |     |
|--|-----|
| ttttcaagta cgggtgactaa ggttgtagat gagacaaaaa aagtcgtgaa gcgtgcagaa | 120 |
| cagtcagcaa gcgcagctgg taaggctggt tctaaaaaag ttgaacaagc agtagaagct  | 180 |
| accaaagagc aagctcaaaa agtagctaata tctgtagaag attttgcagc aaatttggtt | 240 |
| ggacttccac ttgatcgtgc caagactttc tatgatgaag gaatcaagtc tgcttcagat  | 300 |
| ttcaaaaact ggactgaaaa agaactcctt gccttgaaag gaatcggccc agctaccatc  | 360 |
| aagaaattga aagaaaatgg catcaagttc aag                               | 393 |

<210> 31  
 <211> 762  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |     |
|--|-----|
| <400> 31   |     |
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| gacattcaaa aaagaggcga actggttgct ggtgtcaaac aagacgttcc caattttggt  | 120 |
| tacaaagatc ccaagaccgg tacttattct ggtatcgaac ccgacttggc caagatggta  | 180 |
| gctgatgaac tcaaggtcaa gattcgtat gtgccggtta cagcacaac ccgcggcccc    | 240 |
| cttctagaca atgaacaggt cgatatggat atcgcgacct ttaccatcac ggacgaacgc  | 300 |
| aaaaaactct acaactttac cagtccctac tacacagacg cttctggatt tttggtcaat  | 360 |
| aaatctgcca aaatcaaaaa gattgaggac ctaaacggca aaaccatcgg agtcgcccaa  | 420 |
| ggttctatca cccaacgcct gattactgaa ctgggtaaaa agaaaggctt gaagtttaaa  | 480 |
| ttcgtcgaac ttggttccta cccagaattg attacttccc tgcacgctca tcgtatcgat  | 540 |
| accttttccg ttgaccgctc tattctatct ggctacacta gtaaaccggac agcactacta | 600 |
| gatgatagtt tcaagccatc tgactacggt attgttacca agaaatcaaa tacagagctc  | 660 |
| aacgactatc ttgataactt ggttactaaa tggagcaagg atggtagttt gcagaaactt  | 720 |
| tatgaccggtt acaagctcaa accatctagc catactgcag at                    | 762 |

<210> 32  
 <211> 1659  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |     |
|--|-----|
| <400> 32   |     |
| atgagtaata tcagtttaac aacacttggt ggtgtgcgtg agaatggaaa aaatatgtac  | 60  |
| attgctgaaa ttggagagtc catttttggt ttgaatgtag ggttaaaata tcctgaaaat  | 120 |
| gaacaattag gggctgatgt ggtgattcca aacatggatt acctttttga aaatagcgac  | 180 |
| cgtattgctg gggttttctt gaccacggg catgcggatg ccattgggtgc tctaccgtat  | 240 |
| ctcttggcag aggctaaagt tcctgtatct gggctctgagt tgaccattga gttggcaaag | 300 |

## 1028462\_1.TXT

```

ctctttgtca aaggaaatga tgccgttaag aaatttaatg atttccatgt cattgatgag 360
aatacggaga ttgatttttg tgggacagtg gtttccttct tccctacgac ttactccgtt 420
ccagagagtc tgggaattgt cttgaagaca tcggaaggaa gcatcgttta tacagggtgac 480
ttcaaatttg accaaacggc tagtgaatct tatgcaactg attttgctcg tttggcagag 540
attggtcgtg acggcgtcct ggctctcctc agtgattcgg ccaatgcaga cagcaatatt 600
cagggtggcta gtgaaagtga agttagggat gaaattaccc aaactattgc tgactgggaa 660
ggtcgtatca tcgttgcagc tgtttccagt aatctttctc gtattcagca gatttttgac 720
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cgcacagcga ttcgtcttaa gaagttgtct ttagccaacg aaattctttt gattaagcct 840
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cgtgtggaaa atatgattta tcaggcaggt ggggttgtca aattgattac ccaaagttaa 1080
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agttcagaat tgattaacca aacggtagaa gagtatcttc aaggagatga ctttgactgg 1560
gcagatctca aaggtaaggt tcgtgacaat ctgaccaagt acctctttga tcaaaccaag 1620
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```

```

<210> 33
<211> 6420
<212> DNA
<213> Streptococcus pneumoniae

```

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<400> 33
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cctaattgagg tagtcttagc agacacatct agctctgaag atgctttaaa catctctgat 120
aaagaaaaag tagcagaaaa taaagagaaa catgaaaata tccatagtgc tatggaaact 180
tcacaggatt ttaaagagaa gaaaacagca gtcattaagg aaaaagaagt tgttagtaaa 240
aatcctgtga tagacaataa cactagcaat gaagaagcaa aaatcaaaga agaaaattcc 300

```

## 1028462\_1.TXT

|            |            |            |            |            |             |      |
|------------|------------|------------|------------|------------|-------------|------|
| aataaatccc | aaggagatta | tacggactca | tttgtgaata | aaaacacaga | aatcccaaa   | 360  |
| aaagaagata | aagttgtcta | tattgctgaa | tttaaagata | aagaatctgg | agaaaaagca  | 420  |
| atcaaggaac | tatccagtct | taagaataca | aaagttttat | atacttatga | tagaattttt  | 480  |
| aacggtagt  | ccatagaaac | aactccagat | aacttggaca | aaattaaaca | aatagaaggt  | 540  |
| atttcacg   | ttgaaagggc | acaaaaagtc | caacccatga | tgaatcatgc | cagaaaggaa  | 600  |
| attggagttg | aggaagctat | tgattaccta | aagtctatca | atgctccgtt | tgggaaaaat  | 660  |
| tttgatggta | gaggtatggt | catttcaa   | atcgatactg | gaacagatta | tagacataag  | 720  |
| gctatgagaa | tcgatgatga | tgccaaagcc | tcaatgagat | ttaaaaaaga | agacttaaaa  | 780  |
| ggcactgata | aaaattattg | gttgagtgat | aaaatccctc | atgctgtcaa | ttattataat  | 840  |
| ggtggcaaaa | tcactgtaga | aaaatatgat | gatggaaggg | attattttga | cccacatggg  | 900  |
| atgcatattg | cagggattct | tgctggaaat | gatactgaac | aagacatcaa | aaactttaac  | 960  |
| ggcatagatg | gaattgcacc | taatgcacaa | attttctctt | acaaaatgta | ttctgacgca  | 1020 |
| ggatctgggt | ttgcgggtga | tgaaacaatg | tttcatgcta | ttgaagattc | tatcaaacac  | 1080 |
| aacgttgatg | ttgtttcgg  | atcatctggt | tttacaggaa | caggtcttgt | aggtgagaaa  | 1140 |
| tattggcaag | ctattcgggc | attaagaaaa | gcaggcattc | caatggttgt | cgctacgggt  | 1200 |
| aactatgcga | cttctgcttc | aagttcttca | tgggatttag | tagcaaataa | tcattctgaaa | 1260 |
| atgaccgaca | ctggaaatgt | aacacgaact | gcagcacatg | aagatgcatg | agcggtcgct  | 1320 |
| tctgctaaaa | atcaaacagt | tgagtttgat | aaagttaaca | taggtggaga | aagttttaaa  | 1380 |
| tacagaaata | taggggcctt | tttcgataag | agtaaaatca | caacaaatga | agatggaaca  | 1440 |
| aaagctccta | gtaaattaaa | atttgtatat | ataggcaagg | ggcaagacca | agatttgata  | 1500 |
| ggtttgatc  | ttaggggcaa | aattgcagta | atggatagaa | tttatacaaa | ggatttaaaa  | 1560 |
| aatgctttta | aaaaagctat | ggataaggg  | gcacgcgcca | ttatggttgt | aaatactgta  | 1620 |
| aattactaca | atagagataa | ttggacagag | cttcagcta  | tgggatatga | agcggatgaa  | 1680 |
| ggtactaaaa | gtcaagtgtt | ttcaatttca | ggagatgatg | gtgtaaagct | atggaacatg  | 1740 |
| attaatcctg | ataaaaaaac | tgaagtcaaa | agaaataata | aagaagattt | taaagataaa  | 1800 |
| ttggagcaat | actatccaat | tgatatggaa | agttttaatt | ccaacaaacc | gaatgtaggt  | 1860 |
| gacgaaaaag | agattgactt | taagtttgca | cctgacacag | acaaagaact | ctataaagaa  | 1920 |
| gatatcatcg | ttccagcagg | atctacatct | tgggggccaa | gaatagattt | acttttaaaa  | 1980 |
| cccgatgttt | cagcacctgg | taaaaatatt | aatccacgc  | ttaatgttat | taatggcaaa  | 2040 |
| tcaacttatg | gctatatgtc | aggaactagt | atggcgactc | caatcgtggc | agcttctact  | 2100 |
| gttttgatta | gaccgaaatt | aaaggaaatg | cttgaaagac | ctgtattgaa | aatcttaag   | 2160 |
| ggagatgaca | aatagatctt | tacaagtctt | acaaaaattg | ccctacaaaa | tactgcgcga  | 2220 |

1028462\_1.TXT

|             |             |            |            |             |            |      |
|-------------|-------------|------------|------------|-------------|------------|------|
| cctatgatgg  | atgcaacttc  | ttggaaagaa | aaaagtcaat | actttgcatc  | acctagacaa | 2280 |
| cagggagcag  | gcctaattaa  | tgtggccaat | gctttgagaa | atgaagttgt  | agcaactttc | 2340 |
| aaaaaactg   | attctaaagg  | tttggtaaac | tcatatgggt | ccatttctct  | taaagaaata | 2400 |
| aaaggtgata  | aaaaataactt | tacaatcaag | cttcacaata | catcaaacag  | acctttgact | 2460 |
| tttaaagttt  | cagcatcagc  | gataactaca | gattctctaa | ctgacagatt  | aaaacttgat | 2520 |
| gaaacatata  | aagatgaaaa  | atctccagat | ggtaagcaaa | ttgttccaga  | aattcaccca | 2580 |
| gaaaaagtca  | aaggagcaaa  | tatcacat   | gagcatgata | ctttcactat  | aggcgcaaat | 2640 |
| tctagctttg  | atttgaatgc  | ggttataaat | gttgagagag | ccaaaaacaa  | aaataaattt | 2700 |
| gtagaatcat  | ttattcattt  | tgagtcagtg | gaagaaatgg | aagctctaaa  | ctccaacggg | 2760 |
| aagaaaataa  | acttccaacc  | ttctttgtcg | atgcctctaa | tgggatttgc  | tgggaattgg | 2820 |
| aaccacgaac  | caatccttga  | taaatgggct | tgggaagaag | ggtcaagatc  | aaaaaactg  | 2880 |
| ggaggttatg  | atgatgatgg  | taaaccgaaa | attccaggaa | ccttaaataa  | gggaattggt | 2940 |
| ggagaacatg  | gtatagataa  | atttaatcca | gcaggagtta | tacaaaatag  | aaaagataaa | 3000 |
| aataacaacat | ccctggatca  | aaatccagaa | ttatttgctt | tcaataacga  | agggatcaac | 3060 |
| gctccatcat  | caagtgggtc  | taagattgct | aacatttatc | cttttagattc | aaatggaaat | 3120 |
| cctcaagatg  | ctcaacttga  | aagaggatta | acaccttctc | cacttgtatt  | aagaagtgca | 3180 |
| gaagaaggat  | tgatttcaat  | agtaaataca | aataaagagg | gagaaaatca  | aagagactta | 3240 |
| aaagtcattt  | cgagagaaca  | ctttattaga | ggaattttta | attctaaaag  | caatgatgca | 3300 |
| aagggaatca  | aatcatctaa  | actaaaagtt | tggggtgact | tgaagtggga  | tggactcatc | 3360 |
| tataatccta  | gaggtagaga  | agaaaatgca | ccagaaagta | aggataatca  | agatcctgct | 3420 |
| actaagataa  | gaggtcaatt  | tgaaccgatt | gcggaaggtc | aatatttcta  | taaattttaa | 3480 |
| tatagattaa  | ctaaagatta  | cccatggcag | gtttcctata | ttcctgtaaa  | aattgataac | 3540 |
| accgccccta  | agattgtttc  | ggttgatttt | tcaaactctg | aaaaaattaa  | gttgattaca | 3600 |
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| caaaaagaac  | atcctgaaaa  | atttgacgag | attgcgaacg | aagtttggtg  | tgctggcgcc | 3720 |
| gctcttggtt  | atgaagatgg  | agaggttgaa | aaaaatcttg | aagtaactta  | cgcaggtgag | 3780 |
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| acaagatttc  | atagaattaa  | atttgcta   | caggctgatg | aaaaggggat  | gatttcctat | 3960 |
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| aataaaccta | cttttgatgt | atcgaaaaag | aaagataacc | cacaagtaaa | ccatagtcaa | 6180 |
| ttaaatgaaa | gtcacagaaa | agaggattta | caaagagaag | agcattcaca | aaaatctgat | 6240 |
| tcaactaagg | atgttacagc | tacagttctt | gataaaaaca | atatcagtag | taaatcaact | 6300 |
| actaacaatc | ctaataagtt | gccaaaaact | ggaacagcaa | gcggagccca | gacactatta | 6360 |
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| tctgtagttt | atgcggatga aacacttatt actcatactg ctgagaaacc taaagaggaa 180    |
| aaaatgatag | tagaagaaaa ggctgataaa gctttggaaa ctaaaaatat agttgaaagg 240    |
| acagaacaaa | gtgaacctag ttcaactgag gctattgcat ctgagaagaa agaagatgaa 300    |
| gccgtaactc | caaaagagga aaaagtgtct gctaaaccgg aagaaaaagc tccaaggata 360    |
| gaatcacaag | cttcaaataca agaaaaaccg ctcaaggaag atgctaaagc tgtaacaaat 420   |
| gaagaagtga | atcaaatgat tgaagacagg aaagtggatt ttaatcaaaa ttggtacttt 480    |
| aaactcaatg | caaattctaa ggaagccatt aaacctgatg cagacgtatc tacgtggaaa 540    |
| aaattagatt | taccgtatga ctggagtatc tttaacgatt tcgatcatga atctcctgca 600    |
| caaatgaag  | gtggacagct caacggtggg gaagcttggg atcgcaagac tttcaaacta 660    |
| gatgaaaaag | acctcaagaa aaatgttcgc cttacttttg atggcgtcta catggattct 720    |
| caagtttatg | tcaatggtca gttagtgggg cattatccaa atgggtataa ccagttctca 780    |
| tatgatatac | caaaatacct tcaaaaagat ggtcgtgaga atgtgattgc tgtccatgca 840    |
| gtcaacaaac | agccaagtag ccgttggtat tcaggaagtg gtatctatcg tgatgtgact 900    |
| ttacaagtga | cagataaggt gcatgttgag aaaaatggga caactatttt aacaccaaaa 960    |
| cttgaagaac | aacaacatgg caaggttgaa actcatgtga ccagcaaaat cgtcaatacg 1020   |
| gacgacaaag | accatgaact tgtagccgaa tatcaaactg ttgaacgagg tggatcatgct 1080  |
| gtaacaggct | tagttcgtac agcgagtcgt accttaaaag cacatgaatc aacaagccta 1140   |
| gatgcgattt | tagaagttga aagacaaaaa ctctggactg ttttaaatga caaacctgcc 1200   |
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| ctcgttcagg  | aagaggcctt | tgatacgtgg   | tatggtggca  | agaaacctta  | tgactatgga  | 1560 |
| cgtttctttg  | aaaaagatgc | cactcaccca   | gaagctcgaa  | aagggtgaaa  | atggtctgat  | 1620 |
| tttgacctac  | gtaccatggt | cgaaagaggc   | aaaaacaacc  | ctgctatctt  | catgtggtca  | 1680 |
| attggtaatg  | aaataggtga | agctaattggt  | gatgccact   | ctttagcaac  | tgttaaacgt  | 1740 |
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| ggatttaact  | attctgaaga | taattacaaa   | gcccttagag  | ctaagcatcc  | aaaatggttg  | 1920 |
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| cgtgaattga  | aacatagcaa | tggaacctgag  | cgtaattatg  | aacagtcaga  | ttatggaaat  | 2040 |
| gatcggtgtg  | gttgggggaa | aacagcaacc   | gcttcattgga | cttttgaccg  | tgacaacgct  | 2100 |
| ggctatgctg  | gacagtttat | ctggacaggt   | acggactata  | ttggtgaacc  | tacaccatgg  | 2160 |
| cacaaccaa   | atcaaactcc | tgtaagagc    | tcttactttg  | gtatcgtaga  | tacagccggc  | 2220 |
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| atggtacacc  | ttcttcctca | ctggaactgg   | gaaaacaaag  | aattagcatc  | caaagtagct  | 2340 |
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| acttaccaag  | aagggtgcaa | tgctaataaa   | ctttatcttg  | aatggaaagt  | tgccatatcaa | 2520 |
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| attacgactg  | ctggtaagcc | agcggcagtt   | cgtcttatta  | aggaagacca  | tgcgattgca  | 2640 |
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| aaattcaccc  | tgactgccc  | ctctgatctc   | ttgaaatcga  | accaagtcac  | tgtctttact  | 2940 |
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## 1028462\_1.TXT

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<213> Streptococcus pneumoniae

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## 1028462\_1.TXT

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| aaatacgaaa  | atggaaaaga  | aactaatgaa | tcactgataa | caactattcc  | tgatgataag  | 1980 |
| agcaattatt  | atttaaaaaat | aacttcaaat | aatcagaaaa | ctacattact  | agctgttaaa  | 2040 |
| aatatagaag  | aaactacggt  | taacggaaca | cctgtatata | aagttacagc  | aatcgcagac  | 2100 |
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| tcattagcca  | atactatgaa  | aggttcttca | gttattacaa | atgtcaaaat  | tacaggcaca  | 2520 |
| ctttcaggtc  | gtaataatgt  | tgctggattt | gtaaataata | tgaatgatgg  | aactcgtatt  | 2580 |
| gaaaatgttg  | ctttcttttg  | caaactacac | tctacaagtg | gaaatggctc  | tcatacaggg  | 2640 |
| ggaattgcag  | gtacaaacta  | tagaggaatt | gttagaaaag | catatgttga  | tgctactatt  | 2700 |
| acaggaaaca  | aaacacgcgc  | cagcttggtt | gttcctaaag | tagattatgg  | attaactcta  | 2760 |
| gaccatctta  | ttgggtacaaa | agctctccta | actgagtcgg | ttgtaaaagg  | taaaatagat  | 2820 |
| gtttcaaadc  | cagtagaagt  | tgaggaata  | gcaagtaaga | cttggcctgt  | aggtacggta  | 2880 |
| agtaattctg  | tcagctatgc  | taagattatc | cgtggagagg | agttattcgg  | ctctaacgac  | 2940 |
| gttgatgatt  | ctgattatgc  | tagtgctcat | ataaaagatt | tatatgcggt  | agagggatat  | 3000 |
| tcgtcaggta  | atagatcatt  | taggaaatct | aaaacattta | ctaaattaac  | taaagaacaa  | 3060 |
| gctgatgcta  | aagttactac  | tttcaatatt | actgctgata | aattagaaag  | tgatctatct  | 3120 |
| cctcttgcaa  | aacttaatga  | agaaaaagcc | tattctagta | ttcaagatta  | taacgctgaa  | 3180 |
| tataaccaag  | cctataaaaa  | tcttgaaaaa | ttaataccat | tctacaataa  | agatttatatt | 3240 |
| gtatatcaag  | gtaataaatt  | aaataaagaa | caccatctaa | atactaaaga  | agttctttct  | 3300 |
| gttaccgcga  | tgaacaacaa  | tgagtttatc | acaaacctag | atgaagctaa  | taaaattatt  | 3360 |
| gttcactatg  | cggacggtac  | aaaagattac | tttaacttgt | cttctagcag  | tgaaggttta  | 3420 |
| agtaatgtaa  | aagaatatac  | tataactgac | ttaggaatta | aatatacacc  | taatatcggt  | 3480 |
| caaaaagata  | acactactct  | tgttaatgat | ataaaatcta | ttttagaatc  | agtagagctt  | 3540 |
| cagtctcaaa  | cgatgtatca  | gcatctaaat | cgattaggtg | actatagagt  | taatgcaatc  | 3600 |
| aaagattttat | atttagaaga  | aagcttcaca | gatgttaaag | aaaacttaac  | aaacctaadc  | 3660 |
| acaaaattag  | ttcaaaacga  | agaacatcaa | ctaaatgatt | ctccagctgc  | tcgtcaaatg  | 3720 |
| attcgtgata  | aagtcgagaa  | aaacaaagca | gctttattac | taggtttaac  | ttacctaadt  | 3780 |

## 1028462\_1.TXT

|             |             |             |             |             |             |      |
|-------------|-------------|-------------|-------------|-------------|-------------|------|
| cgttactatg  | gagttaaatt  | tggtgatggt  | aatattaaag  | aattaatgct  | attcaaacca  | 3840 |
| gattttctatg | gtgaaaaagt  | tagcgtatta  | gacagattaa  | ttgaaatcgg  | ttctaaagag  | 3900 |
| aacaacatta  | aagggttcacg | tacattcgac  | gcattcggtc  | aagtattggc  | taaatatact  | 3960 |
| aaatcaggta  | atttagatgc  | atTTTTaaat  | tataatagac  | aattgttcac  | aaatatagac  | 4020 |
| aatatgaacg  | attggtttat  | tgatgctaca  | gaagaccatg  | tctacatcgc  | agaacgcgct  | 4080 |
| tctgaggtcg  | aagaaattaa  | aaattctaaa  | catcgtgcat  | tcgataatTT  | aaaacgaagt  | 4140 |
| caccttagaa  | atactatact  | cccactactg  | aatattgata  | aagcacatct  | ttattttaatt | 4200 |
| tcaaattata  | atgcaattgc  | ctttggtagt  | gcagagcgat  | taggtaaaaa  | atcattagaa  | 4260 |
| gatattaaag  | atatcgttaa  | caaagctgca  | gatggttata  | gaaactatta  | tgattttctgg | 4320 |
| tatcgtctag  | cgtctgataa  | cgTTaaacaa  | cgactactaa  | gagatgctgt  | tattcctatt  | 4380 |
| tggaaggtt   | ataacgctcc  | tggtggatgg  | gttgaaaaat  | atggccgcta  | taataccgac  | 4440 |
| aaagtatata  | ctcctcttag  | agaattcttt  | ggctctatgg  | ataagtatta  | taattataat  | 4500 |
| ggaacaggag  | cttatgctgc  | tatatatcct  | aactctgatg  | atattagaac  | tgatgtaaaa  | 4560 |
| tatgttcatt  | tagaaatggg  | tggtgaatac  | gggtatttcag | tttacacaca  | tgaacaaca   | 4620 |
| cacgtcaacg  | accgtgcat   | ttacttaggt  | ggctttggac  | accgtgaagg  | tactgatgct  | 4680 |
| gaagcatatg  | ctcaggggat  | gctacaaact  | cctgttactg  | gtagtggatt  | tgatgagttt  | 4740 |
| ggttcttttag | gtattaatat  | gggtattttaa | cgcaaaaatg  | atgggaatca  | gtgggtatatt | 4800 |
| acagatccaa  | aaactctaaa  | aacacgagaa  | gatattaata  | gatatatgaa  | gggttataat  | 4860 |
| gacactttaa  | ctcttcttga  | tgaattgag   | gctgaatctg  | tgattttctca | acaaaataaa  | 4920 |
| gatttaata   | gtgcatgggt  | caaaaaaata  | gatagagaat  | accgtgataa  | caataaatta  | 4980 |
| aatcaatggg  | ataaaattcg  | aaatctaagt  | caagaagaga  | aaaatgaatt  | aaatattcaa  | 5040 |
| tctgttaatg  | atttagttga  | tcaacaatta  | atgactaatc  | gcaatccagg  | taatggatc   | 5100 |
| tataaaccg   | aagcaattag  | ctataacgat  | caatcacctt  | atgtagggtg  | tagaatgatg  | 5160 |
| accggtatct  | acggaggtaa  | tactagtaaa  | ggtgctcctg  | gagctgtttc  | attcaaakat  | 5220 |
| aatgctttta  | gattatgggg  | ttactacgga  | tacgaaaatg  | ggttcttagg  | ttatgcttca  | 5280 |
| aataaatata  | aacaacaatc  | taaaacagat  | ggtagagtctg | ttctaagtga  | tgaatatatt  | 5340 |
| atcaagaaaa  | tatctaacaa  | tacatttaat  | actattgaag  | aatttaaaaa  | agcttacttc  | 5400 |
| aaagaagtta  | aagataaagc  | aacgaaagga  | ttaacaacat  | tcgaagtaaa  | tggttcttcc  | 5460 |
| gtttcatcat  | acgatgattt  | actgacattg  | tttaaagaag  | ctgttaaaaa  | agatgccgaa  | 5520 |
| actcttaaac  | aagaagcaaa  | cggttaataaa | acagtatcta  | tgaataatac  | agttaaatta  | 5580 |
| aaagaagctg  | tttataagaa  | acttcttcaa  | caaacaata   | gctttaaaac  | ttcaatcttt  | 5640 |

aaa

5643

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 <211> 996  
 <212> DNA  
 <213> Streptococcus pneumoniae

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 aatggctatt cggatattca cgaggagaa cctggttatt ctgccaagtt agaccgtgat 180  
 catgatggtg tggcttgca attgaaaaat gctcctaagg gtgcttttaa agcaaacag 240  
 tcaacggcta ttcaaatcaa cacaagttca gcaacaacaa gtggttggt taagcaggac 300  
 ggcgcttggt actactttga tggaaatgga aatctagtga aaaatgcatg gcagggaagc 360  
 tattacctga aagctgatgg taaaatggca cagagtgaat ggatttatga ctcttcttat 420  
 caagcttggt attatttgaa atcagatggt tcttatgcaa aaaatgcatg gcaaggagct 480  
 tattacctta aatcaaacgg taaaatggca caaggtgagt gggtttatga ttcttcttac 540  
 caagcatggt attacttgaa atcagatggt tcatatgctc gcaatgcatg gcaaggaaac 600  
 tactatttga aatcagatgg taaaatggct aaaggtgaat gggtttatga tgccacctat 660  
 caagcttggt attatttgac atcagatggt tcttatgctt acagtacatg gcaaggaaat 720  
 tactatctaa aatcggatgg taaaatggct gtcaatgaat gggttgatgg tggacgttat 780  
 tatgttggcg ctgacggagt ttggaaggaa gttcaagcaa gtacagcttc ttctagtaat 840  
 gatagcaata gtgaatattc tgctgcttta ggaaaggcaa aaagttataa ttcgttattc 900  
 cacatgtcaa aaaaacgtat gtatagacaa ttaacttctg attttgataa attttcaaat 960  
 gatgcagctc aatatgccat tgatcattta gatgat 996

<210> 37  
 <211> 1350  
 <212> DNA  
 <213> Streptococcus pneumoniae

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 ggtgaatctg cagctcgttt gttggacaag ctaggtgcca ttgtgacagt aaatgatggg 120  
 aaacctttcg aggacaatcc agctgcccac agtttgctgg aagaagggat caaggtcatt 180  
 acaggtggcc atcctttgga actcttgat gaagagtttg cccttatggt gaaaaatcca 240  
 ggtatccctt acaacaatcc catgattgaa aaggcttttg ccaagggaat tccagtcttg 300  
 actgaggtgg aattggctta ttgatttca gaagcaccga ttattggtat cacaggatcg 360  
 aacggtaaga caaccacaac gactatgatt ggggaagttt tgactgctgc tggccaacat 420

## 1028462\_1.TXT

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gggtcttttat caggggaatat cggctatcca gctagtcagg ttgctcaaat agcatcagat 480
aaggacacgc ttgttatgga actttcttct ttccaactca tgggtgttca agaattccat 540
ccagagattg cggttattac caacctcatg ccaactcata tcgactacca tgggtcattt 600
tcggaatatg tagcagccaa gtggaatatc cagaacaaga tgacagcagc tgatttcctt 660
gtcttgaact ttaatcaaga cttggcaaaa gacttgactt ccaagacaga agccactgtt 720
gtaccatttt caacacttga aaagggttgat ggagcttatc tggaagatgg tcaactctac 780
ttccgtggtg aagtagtcat ggcagcgaat gaaatcggtg ttccaggtag ccacaatgtg 840
gaaaatgccc ttgcgactat tgctgtagcc aagcttcgtg atgtggacaa tcaaaccatc 900
aaggaaactc tttcagcctt cggtggtgtc aaacaccgtc tccagtttgt ggatgacatc 960
aagggtgtta aattctataa cgacagtaaa tcaactaata tcttggttac taaaaagcc 1020
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gagtttgacg aattggtgcc agacattact ggactcaaga agatgggtcat cctgggtcaa 1140
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gatattgcag atgcgacccg caaggcctat gagcttgcca ctcaaggaga tgtggttctt 1260
cttagtcctg ccaatgctag ctgggatatg tatgctaact ttgaagtacg tggcgacctc 1320
tttatcgaca cagtagcgga gttaaaagaa 1350

```

```

<210> 38
<211> 1158
<212> DNA
<213> Streptococcus pneumoniae

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<400> 38
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tgtggagaag tgaagtctgg agcagtcaac actgctggta actcagtaga ggaaaagaca 120
attaaaatcg ggtttaactt tgaagaatca ggttcttttag ctgcatacgg aacagctgaa 180
caaaaagggtg cccaattggc tgttgatgaa atcaatgccg cagggtggtat cgatggaaaa 240
caaatcgaag tagtcgataa agataataag tctgaaacag ctgaggctgc ttcagttaca 300
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actcaagatg gattgactaa aggtcaagat tacctcttta ttggaacttt ccaagatagc 480
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ctttacactg acaatgccag tgactatgct aaagggattg caaaatcttt ccgcgagtca 600
tacaagggtg aaatcgttgc agatgaaact ttcgtagcag gtgacacaga cttccaagca 660
gcccttacia aaatgaaagg gaaagacttt gatgctatcg ttgttcctgg ttactataat 720

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## 1028462\_1.TXT

|   |      |
|---|------|
| gaggctggta aaattgtaaa ccaagcgcgt ggcattgggaa ttgacaaacc aatcgttgggt | 780  |
| ggtgatggat tcaacggtga ggagtttgta caacaagcaa ctgctgaaaa agcatcaaac   | 840  |
| atctacttta tctcaggctt ctcaactact gtagaagttt cagctaaagc taaagccttc   | 900  |
| cttgacgctt accgtgctaa gtacaatgaa gagccttcaa catttgcagc cttggcttat   | 960  |
| gattcagttc accttgtagc aaacgcagca aaagggtgcta aaaattcagg tgaaatcaag  | 1020 |
| aataaccttg ctaaaacaaa agattttgaa ggtgtaactg gtcaaacaag cttcgatgca   | 1080 |
| gaccacaaca cagtcaaaac tgcttacatg atgaccatga acaatggtaa agttgaagca   | 1140 |
| gcagaagttg taaaacca   | 1158 |

<210> 39  
 <211> 1539  
 <212> DNA  
 <213> Streptococcus pneumoniae

|   |      |
|---|------|
| <400> 39  |      |
| atgagtatatt tagaagttaa aaatctgagt cacggttttg gtgaccgtgc aatttttgaa  | 60   |
| gatgtgtcct tccgtctcct caagggagaa catatcggcc tggctcgtgc caatggtgaa   | 120  |
| ggaaaatcaa cctttatgag tatcgtgact ggtaaaatgc tgccagatga aggaaagggtt  | 180  |
| gagtgggtcca aatatgtgac ggctgggttac ttggatcagc actctgtcct tgctgaaaga | 240  |
| cagtcggtgc gtgatgttct ccgtacggct tttgatgagc ttttcaaagc tgaagctcgt   | 300  |
| atcaatgacc tctatatgaa aatggctgaa gacggcgcggt atgttgatgc tctcatggaa  | 360  |
| gaagtaggag aacttcaaga ccgtctggag agtcgtgatt tctatacctt ggatgctaag   | 420  |
| attgacgaag tagcgcgtgc tcttgggtgtt atggactttg gcatggatac ggatgtaact  | 480  |
| tctttgtcag gtgggcaaag aaccaagggtg cttttggcaa aacttctcct tgaaaagcct  | 540  |
| gatatcttgc tgttggacga gccgaccaac tacttggatg ctgagcatat tgattggctc   | 600  |
| aagcgtatc tccaaaacta tgagaatgcc tttgttctca tttcgcacga tattccattc    | 660  |
| ctcaatgacg ttattaatat tgtctatcat gtggaaaatc aacagctgac gcgttactct   | 720  |
| ggtgactact accagttcca agaagtttat gctatgaaga aatctcagct agaggcagcc   | 780  |
| tacgaacgcc agcagaaaga gattgcagac ctcaaggact ttgtggctcg taataaagcc   | 840  |
| cgtgttgcaa ctcgtaatat ggctatgtct cgtcaaaaga aattggataa gatggatatt   | 900  |
| atcgaactcc aaagtgagaa accaaaacca tcctttgatt tcaaaccagc tcgtacacca   | 960  |
| gggcgcttta tcttccaagc caagaacttg caaattgggtt acgaccgtcc tcttactaag  | 1020 |
| cctttaaatc ttaccttga acgcaatcaa aagggttgca ttattgggtgc taatgggtatt  | 1080 |
| ggaaaaacaa ctctcttgaa gagtctcttg ggcattatct cgccaatcgc tggggaagtg   | 1140 |
| gagcgtggag attatttaga acttgggttat tttgagcagg aagtagaagg cggtaatcgc  | 1200 |

## 1028462\_1.TXT

|            |            |            |            |            |            |      |
|------------|------------|------------|------------|------------|------------|------|
| caaactcctc | ttgaagctgt | ctggaatgcc | tttcctgccc | ttaatcaagc | agaagtccgt | 1260 |
| gcagcccttg | cccgttggtg | tttgacaacc | aaacatattg | aaagccagat | tcaagtatta | 1320 |
| tcagggggag | agcaagccaa | ggttcgtttc | tgtctcttga | tgaatcgtga | aaacaacggt | 1380 |
| ttagtgtctg | acgagccgac | caaccatttg | gatgtggatg | caaaggatga | gctcaaacgc | 1440 |
| gctctcaaag | aatatagggg | atctatcctt | atggtctgcc | acgagccaga | cttttatgaa | 1500 |
| ggctggatag | accaaatatg | ggattttaat | aatttaact  |            |            | 1539 |

<210> 40  
 <211> 1197  
 <212> DNA  
 <213> Streptococcus pneumoniae

|            |  |
|------------|--|
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| agtgtagtgt | tattgggtgc tggggggatt ttactcttta gacaaccttc tcagactgct 120   |
| ctaaaagatg | agcctactca tcttggtgtt gccaaaggaag gaagcgtggc ctcctctggt 180  |
| ttattgtcag | ggacagtaac agcaaaaaat gaacaatatg tttatcttga tgctagtaag 240   |
| ggtgatttag | atgaaatcct tgtttctgtg ggcgataagg tcagcgaagg gcaggcttta 300   |
| gtcaagtaca | gtagttcaga agcgcaggcg gcctatgatt cagctagtcg agcagtagct 360   |
| agggcagatc | gtcatatcaa tgaactcaat caagcacgaa atgaagccgc ttcagctccg 420   |
| gtccacaggt | taccagcgcc agtaggagga gaagatgcaa cggtgcaaag cccaactcca 480   |
| gtggctggaa | attctgttgc ttctattgac gctcaattgg gtgatgcccg tgatgcgcgt 540   |
| gcagatgctg | cggcgcaatt aagcaaggct caaagtcaat tggatgcaac aactgttctc 600   |
| agtaccctag | agggaactgt ggtcgaagtc aatagcaatg tttctaaatc tccaacaggg 660   |
| gcgagtcaag | ttatggttca tattgtcagc aatgaaaatt tacaagtcaa gggagaattg 720   |
| tctgagtaca | atctagccaa cttttctgta ggtcaagaag taagctttac ttctaaagtg 780   |
| tatcctgata | aaaaatggac tgggaaatta agctatatatt ctgactatcc taaaaacaat 840  |
| ggtgaagcag | ctagtccagc agccgggaat aatacagggt ctaaataccc ttatactatt 900   |
| gatgtgacag | gcgagggttg tgatttgaaa caagggtttt ctgtcaacat tgagggttaa 960   |
| agcaaaacta | aggctattct tgttcctgtt agcagtctag taatggatga tagtaaaaaat 1020 |
| tatgtctgga | ttgtggatga acaacaaaag gctaaaaaag ttgagggttc attgggaaat 1080  |
| gctgacgcag | aaaatcaaga aatcacttct ggtttaacga acggtgctaa ggtcatcagt 1140  |
| aatccaacat | cttccttgga agaaggaaaa gaggtgaagg ctgatgaagc aactaat 1197     |

<210> 41  
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&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 41

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gctgccgttt cgcgagaaaa actcttgcta gaccaagata gggaactagc caaaaaatcc      300
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accttcctgc tcggacaact tttcagcatt                                     690

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&lt;210&gt; 42

&lt;211&gt; 1881

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 42

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gggaatgttc aggtcaaga aagttcagga aataaaatcc actttatcaa tgttcaagaa      120
gggtggcagtg atgcgattat tcttgaaagc aatggacatt ttgccatggt ggatacagga      180
gaagattatg atttcccaga tggaagtgat tctcgtatc catggagaga aggaattgaa      240
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caaaaacttg attttatttt ggtgacccat acccacagtg atcatattgg aaatgttgat      360
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attactaatt ctgaacgtct atgggataat ctgtatggct atgataaggt ttacagact      480
gctgcagaaa aaggtgtttc agttattcaa aatatcacac aaggggatgc tcattttcag      540
tttggggaca tggatattca gctctataat tatgaaaatg aaactgattc atcgggtgaa      600
ttaaagaaaa tttgggatga caattccaat tccttgatta gcgtgggtgaa agtcaatggc      660
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cctctcattg gaaaagttga tttgatgaag tttaatcatc accatgatac caacaaatca      780
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1028462\_1.TXT

|            |             |            |            |             |             |      |
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| ctaccttgga | aaaatggtgt  | tgatagtgag | tatgttaatt | ggctcaaaga  | acgaggaatt  | 900  |
| gagagaatca | acgcagccag  | caaagactat | gatgcaacag | tttttgatat  | tcgaaaagac  | 960  |
| ggttttgtca | atattttcaac | atcctacaag | ccgattccaa | gtttttcaagc | tggttggcat  | 1020 |
| aagagtgcac | atgggaactg  | gtggtatcaa | gcgcttgatt | ctacaggaga  | gtatgctgtc  | 1080 |
| ggttggaatg | aaatcgaagg  | tgaatggtat | tactttaacc | aaacgggtat  | cttgttacag  | 1140 |
| aatcaatgga | aaaaatggaa  | caatcattgg | ttctatttga | cagactctgg  | tgcttctgct  | 1200 |
| aaaaattgga | agaaaatcgc  | tggaatctgg | tattatttta | acaaagaaaa  | ccagatggaa  | 1260 |
| attggttgga | ttcaagataa  | agagcagtgg | tattatttgg | atggtgatgg  | ttctatgaag  | 1320 |
| acaggatggc | ttcaatatat  | ggggcaatgg | tattactttg | ctccatcagg  | ggaaatgaaa  | 1380 |
| atgggctggg | taaaagataa  | agaaacctgg | tactatatgg | attctactgg  | tgtcatgaag  | 1440 |
| acaggtgaga | tagaagttgc  | tggtcaacat | tattatctgg | aagattcagg  | agctatgaag  | 1500 |
| caaggctggc | ataaaaaggc  | aaatgattgg | tatttctaca | agacagacgg  | ttcacgagct  | 1560 |
| gtgggttgga | tcaaggacaa  | ggataaatgg | tacttcttga | aagaaaatgg  | tcaattactt  | 1620 |
| gtgaacggta | agacaccaga  | aggttatact | gtggattcaa | gtggtgcctg  | gttagtggtat | 1680 |
| gtttcgatcg | agaaatctgc  | tacaattaaa | actacaagtc | attcagaaat  | aaaagaatcc  | 1740 |
| aaagaagtag | tgaaaaagga  | tcttgaaaat | aaagaaacga | gtcaacatga  | aagtgttaca  | 1800 |
| aatttttcaa | ctagtcaaga  | tttgacatcc | tcaacttcac | aaagctctga  | aacgagtgtg  | 1860 |
| aacaaatcgg | aatcagaaca  | g          |            |             |             | 1881 |

<210> 43  
 <211> 1368  
 <212> DNA  
 <213> Streptococcus pneumoniae

|            |   |
|------------|---|
| <400> 43   |   |
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| atcggtgctg | gtttggcagg ttctgaagca gcttaccaaa tcgcagagcg tggatttcca 120  |
| gttaaactat | atgaaatgcg tgggtgtcaag tctacacccc agcataaaac agacaatttt 180 |
| gctgagttgg | tttgttccaa ttctttgcgt ggggatgctt tgacaaatgc agttggtctt 240  |
| ctcaaggaag | aaatgcgtcg cttgggttct gttatcttgg aatctgctga ggctacacgt 300  |
| gttcctgcag | gtggtgccct tgcagtggac cgtgatgggt tctctcaaat ggtgaccgaa 360  |
| aaagttgcca | accacccctt gattgaagtg gttcgtgatg aaattacaga attgccgaca 420  |
| gatgttatta | cggttatcgc tactggctct ttgacaagtg atgccttggc tgaaaagatt 480  |
| catgctctta | atgacgggtg tggtttttat ttctacgatg cggcagcgcc tattatcgat 540  |
| gtcaacacta | tcgatatgag caaggtctac ctcaaatcac gttatgataa gggagaagcg 600  |

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gcctacctca atgcccctat gaccaagcaa gaatttatgg atttccatga agctttggtc 660  
aatgcagaag aagcaccgct tagttctttt gaaaaagaaa agtactttga aggatgtatg 720  
cctatcgaag tcatggccaa acgtggcatt aaaactatgc tttatggccc tatgaagcca 780  
gtcggctttg agtaccaga cgactataca ggacctcgtg atggagaatt taaaacacct 840  
tatgcggttg tgcaacttcg tcaggataat gcagctggta gcctctacaa tattgttggt 900  
ttccagaccc acctcaaatg gggagaacaa aagcgtgtct tccaaatgat tccgggtctt 960  
gaaaatgcgg agtttgtccg ttatggtgtg atgcatcgca attctttacat ggattcacca 1020  
aatcttcttg agcagactta ccgttctaag aaacaaccaa atctcttctt tgctgggtcaa 1080  
atgacgggtg tggaaggcta tgttgagtcg gcggttcag gcttagttgc gggaaattaac 1140  
gcagctcgtc tcttcaagga agaaagcgag gctattttcc ccgagacgac agcgattgga 1200  
agcttagctc attacattac ccatgccgac agcaaacatt tccaaccaat gaatgtcaat 1260  
tttgggatca tcaaggagtt ggaaggcgag cgtatccgtg ataagaaggc tcgttatgaa 1320  
aaaattgcag agcgtgccct tgccgactta gaggaatfff tgactgtc 1368

<210> 44  
<211> 1097  
<212> DNA  
<213> Streptococcus pneumoniae

<400> 44  
atgttaatcg gaatcccaaa agaaattaaa aataacgaaa accgtgtcgc cctcacacct 60  
gcagggtgttc atagcttagt tagtcgtggt catcgtgtcc ttatcgaaac aaatgctggt 120  
ctcggttctg gctttactga tgctgactat caaaagcaag gagctgagat tgtcgtact 180  
gctggtgaag cttgggcagc agagttgggt gtgaaagtaa aagaatcttt aagttctgaa 240  
tacggttact tgcgcgacga tcttcttctc ttcacctact tgcacatggc cgctgctcca 300  
gaattagcag atgctatggt aacagcaaaa acaactgaaa ctgttcgtga caatcaagga 360  
caactaccgc tcctcgttcc tatgagtgag gttgcaggtc gtatggctgt tcaaactgga 420  
gctcacttcc ttactaagca agctggtggc tctggtgttc tacttggtgg tgtaccaggt 480  
gttcacaaaag gaaaagtaac tatcatcggg ggtggtgtcg tcggtacaca tgctgccgcg 540  
atcgcccttg gtcttggtgc tcaagtgact attttagata ttagttccaa gcgtctctca 600  
gttctagaag aagtcttttg aagtcaaatt caaactctta tgtctaattc attcaacatt 660  
gaagcaagtg tgagagatgc tgatgtggtg attggagcca ttctcatccc tgggtgcaaaa 720  
gcaccggaat tgggtgacaga tgagatggtc aaacaaatgc gtccaggctc tgtatcgttg 780  
acgttgctgt tgaccaaggt ggcgttatcg aaacagctga ccgtgtgaca acgcacgatg 840  
aaccctgcta tgaaaaacac ggtgttctcc actatgccgt tgccaatatc cctggtgcgg 900

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|   |      |
|---|------|
| ttgctcgcac ttcaaccatc gccctaacca atgtcactct tccttatatc gaagcttttg | 960  |
| ctggcaaagg attcgcacaa gcaatctctg aagatgaagg cttgcgtcaa ggtgtgacta | 1020 |
| cttatcaagg ttacttgact aacctaccag ttgctcaagg acttaatcgt gactacactg | 1080 |
| atatcaatga tttagta  | 1097 |

<210> 45  
 <211> 2517  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |      |
|--|------|
| <400> 45   |      |
| atgaaaatta ataaaaaata tctagcaggt tcagtggcag tccttgccct aagtgtttgt  | 60   |
| tcctatgaac ttggtcgtca ccaagctggt cagggttaaga aagagtctaa tcgagtttct | 120  |
| tatatagatg gtgatcaggc tgggtcaaaag gcagaaaact tgacaccaga tgaagtcagt | 180  |
| aagagggagg ggatcaacgc cgaacaaatc gtcatacaaga ttacggatca aggttatgtg | 240  |
| acctctcatg gagaccatta tcattactat aatggcaagg tcccttatga tgccatcatc  | 300  |
| agtgaagagc tcctcatgaa agatccgaat tatcagttga aggattcaga cattgtcaat  | 360  |
| gaaatcaagg gtgggttatgt tatcaaggta gatggaaaat actatgttta ccttaaggat | 420  |
| gcagctcatg cggataatat tcggacaaaa gaagagatta aacgtcagaa gcaggaacac  | 480  |
| agtcataatc acgggggttg ttctaacgat caagcagtag ttgcagccag agcccaagga  | 540  |
| cgctatacaa cggatgatgg ttatatcttc aatgcatctg atatcattga ggacacgggt  | 600  |
| gatgcttata tcgttcctca cggcgaccat taccattaca ttcctaagaa tgagttatca  | 660  |
| gctagcgagt tagctgctgc agaagcctat tggaatggga agcagggatc tcgtccttct  | 720  |
| tcaagttcta gttataatgc aaatccagct caaccaagat tgtcagagaa ccacaatctg  | 780  |
| actgtcactc caacttatca tcaaaatcaa ggggaaaaca tttcaagcct tttacgtgaa  | 840  |
| ttgtatgcta aacccttatc agaacgccat gtggaatctg atggccttat tttcgacca   | 900  |
| gcgcaaatca caagtcgaac cgccagaggt gtagctgtcc ctcatggtaa ccattaccac  | 960  |
| tttatccctt atgaacaaat gtctgaattg gaaaaacgaa ttgctcgtat tattccctt   | 1020 |
| cgttatcggt caaaccattg ggtaccagat tcaagaccag aacaaccaag tccacaatcg  | 1080 |
| actccggaac ctagtccaag tccgcaacct gcaccaaatc ctcaaccagc tccaagcaat  | 1140 |
| ccaattgatg agaaattggt caaagaagct gttcgaaaag taggcgatgg ttatgtcttt  | 1200 |
| gaggagaatg gagtttctcg ttatatccca gccaaaggatc tttcagcaga aacagcagca | 1260 |
| ggcattgata gcaaactggc caagcaggaa agtttatctc ataagctagg agctaagaaa  | 1320 |
| actgacctcc catctagtga tcgagaatct tacaataagg cttatgactt actagcaaga  | 1380 |
| attcaccaag atttacttga taataaaggc cgacaagttg attttgaggc tttggataac  | 1440 |

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|  |      |
|--|------|
| ctgtttggaac gactcaagga tgtcccaagt gataaagtca agttagtgga tgatattctt | 1500 |
| gccttcttag ctccgattcg tcatccagaa cgtttaggaa aaccaaattgc gcaaattacc | 1560 |
| tacactgatg atgagattca agtagccaag ttggcaggca agtacacaac agaagacggt  | 1620 |
| tatatctttg atcctcgtga tataaccagt gatgaggggg atgcctatgt aactccacat  | 1680 |
| atgaccata gccactggat taaaaaagat agtttgtctg aagctgagag agcggcagcc   | 1740 |
| caggcttatg ctaaagagaa aggtttgacc cctccttcga cagaccatca ggattcagga  | 1800 |
| aatactgagg caaaaggagc agaagctatc tacaaccgcg tgaaagcagc taagaagggtg | 1860 |
| ccacttgatc gtatgcctta caatcttcaa tatactgtag aagtcaaaaa cggtagttta  | 1920 |
| atcatacctc attatgacca ttaccataac atcaaatttg agtggtttga cgaaggcctt  | 1980 |
| tatgaggcac ctaaggggta tactcttgag gatcttttgg cgactgtcaa gtactatgtc  | 2040 |
| gaacatccaa acgaacgtcc gcattcagat aatggttttg gtaacgctag cgaccatggt  | 2100 |
| cgtaaaaaata aggtagacca agacagtaaa cctgatgaag ataaggaaca tgatgaagta | 2160 |
| agtgagccaa ctcaccctga atctgatgaa aaagagaatc acgctggttt aaatccttca  | 2220 |
| gcagataatc ttataaacc aagcactgat acggaagaga cagaggaaga agctgaagat   | 2280 |
| accacagatg aggtgaaat tcctcaagta gagaattctg ttattaacgc taagatagca   | 2340 |
| gatgcggagg ccttgctaga aaaagtaaca gatcctagta ttagacaaaa tgctatggag  | 2400 |
| acattgactg gtctaaaaag tagtcttctt ctcggaacga aagataataa cactatttca  | 2460 |
| gcagaagtag atagtctctt ggctttgtta aaagaaagtc aaccggctcc tatacag     | 2517 |

<210> 46  
 <211> 3117  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |     |
|--|-----|
| <400> 46   |     |
| atgaaattta gtaaaaaata tatagcagct ggatcagctg ttatcgtatc cttgagtcta    | 60  |
| tgtgcctatg cactaaacca gcatcgttcg caggaaaata aggacaataa tcgtgtctct    | 120 |
| tatgtggatg gcagccagtc aagtcagaaa agtgaaaact tgacaccaga ccaggttagc    | 180 |
| cagaaagaag gaattcaggc tgagcaaatt gtaatcaaaa ttacagatca gggctatgta    | 240 |
| acgtcacacg gtgaccacta tcattactat aatgggaaag ttccttatga tgccctcttt    | 300 |
| agtgaagaac tcttgatgaa ggatccaaac tatcaactta aagacgctga tattgtcaat    | 360 |
| gaagtcaagg gtggttatat catcaaggtc gatggaaaat attatgtcta cctgaaagat    | 420 |
| gcagctcatg ctgataatgt tcgaactaaa gatgaaatca atcgtcaaaa acaagaacat    | 480 |
| gtcaaagata atgagaagggt taactctaata gttgctgtag caaggctctca gggacgatat | 540 |
| acgacaaatg atggttatgt ctttaatcca gctgatatta tcgaagatac gggtaatgct    | 600 |

## 1028462\_1.TXT

|             |             |             |             |            |             |      |
|-------------|-------------|-------------|-------------|------------|-------------|------|
| tatatcgttc  | ctcatggagg  | tcactatcac  | tacattccca  | aaagcgat   | atctgctagt  | 660  |
| gaattagcag  | cagctaaagc  | acatctggct  | ggaaaaaata  | tgcaaccgag | tcagttaagc  | 720  |
| tattcttcaa  | cagctagtga  | caataacacg  | caatctgtag  | caaaaggatc | aactagcaag  | 780  |
| ccagcaaata  | aatctgaaaa  | tctccagagt  | cttttgaagg  | aactctatga | ttcacctagc  | 840  |
| gccaacggtt  | acagtgaatc  | agatggcctg  | gtctttgacc  | ctgctaagat | tatcagtcgt  | 900  |
| acaccaaagt  | gagttgcat   | tccgcatggc  | gaccattacc  | actttattcc | ttacagcaag  | 960  |
| ctttctgcct  | tagaagaaaa  | gattgccaga  | atggtgccta  | tcagtggaac | tggttctaca  | 1020 |
| gtttctacaa  | atgcaaaacc  | taatgaagta  | gtgtctagtc  | taggcagtct | ttcaagcaat  | 1080 |
| ccttcttctt  | taacgacaag  | taaggagctc  | tcttcagcat  | ctgatggtta | tatttttaat  | 1140 |
| ccaaaagata  | tcgttgaaga  | aacggctaca  | gcttatattg  | taagacatgg | tgatcatttc  | 1200 |
| cattacattc  | caaaatcaaa  | tcaaattggg  | caaccgactc  | ttccaaacaa | tagtctagca  | 1260 |
| acaccttctc  | catctcttcc  | aatcaatcca  | ggaacttcac  | atgagaaaca | tgaagaagat  | 1320 |
| ggatacggat  | ttgatgctaa  | tcgtattatc  | gctgaagatg  | aatcagggtt | tgtcatgagt  | 1380 |
| cacggagacc  | acaatcatta  | tttcttcaag  | aaggacttga  | cagaagagca | aattaaggct  | 1440 |
| gcgcaaaaac  | atttagagga  | agttaaaact  | agtcataatg  | gattagattc | tttgtcatct  | 1500 |
| catgaacagg  | attatccaag  | taatgccaaa  | gaaatgaaag  | atttagataa | aaaaatcgaa  | 1560 |
| gaaaaaattg  | ctggcattat  | gaaacaatat  | ggtgtcaaac  | gtgaaagtat | tgtcgtgaat  | 1620 |
| aaagaaaaaa  | atgcgattat  | ttatccgcac  | ggagatcacc  | atcatgcaga | tccgattgat  | 1680 |
| gaacataaac  | cggttggaat  | tggtcattct  | cacagtaact  | atgaactggt | taaacccgaa  | 1740 |
| gaaggagtgt  | ctaaaaaaga  | agggaataaa  | gtttatactg  | gagaagaatt | aacgaatggt  | 1800 |
| gttaattttgt | taaaaaatag  | tacgtttaat  | aatcaaaact  | ttactctagc | caatgggtcaa | 1860 |
| aaacgcgttt  | cttttagttt  | tccgcctgaa  | ttggagaaaa  | aattaggtat | caatatgcta  | 1920 |
| gtaaaattaa  | taacaccaga  | tggaagagta  | ttggagaaag  | tatctggtaa | agtatttgga  | 1980 |
| gaaggagttag | ggaatattgc  | aaactttgaa  | ttagatcaac  | cttatttacc | aggacaaaca  | 2040 |
| tttaagtata  | ctatcgcttc  | aaaagattat  | ccagaagtaa  | gttatgatgg | tacattttaca | 2100 |
| gttccaacct  | cttttagctta | caaaatggcc  | agtcaaacga  | ttttctatcc | tttccatgca  | 2160 |
| ggggatactt  | atttaagagt  | gaaccctcaa  | tttgcagtgc  | ctaaaggaac | tgatgcttta  | 2220 |
| gtcagagtgt  | ttgatgaatt  | tcattggaaat | gcttattttag | aaaataacta | taaagttggt  | 2280 |
| gaaatcaaat  | taccgattcc  | gaaattaaac  | caaggaacaa  | ccagaacggc | cggaaataaa  | 2340 |
| attcctgtaa  | ccttcatggc  | aaatgcttat  | ttggacaatc  | aatcgactta | tattgtggaa  | 2400 |
| gtacctatct  | tggaagaaaga | aaatcaaact  | gataaaccaa  | gtattctacc | acaattttaaa | 2460 |
| aggaataaag  | cacaagaaaa  | cttaaaactt  | gatgaaaagg  | tagaagaacc | aaagactagt  | 2520 |



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gagaaggtag aaaaagaaaa actttctgaa actgggaata gtactagtaa ttcaacgtta 2580  
 gaagaagttc ctacagtga tcctgtacaa gaaaaagtag caaaatttgc tgaaagttat 2640  
 gggatgaagc tagaaaatgt cttgtttaat atggacggaa caattgaatt atatttacca 2700  
 tcgggagaag tcattaaaaa gaatatggca gattttacag gagaagcacc tcaaggaaat 2760  
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 acagaaaata aaccagcaga ttctttacca gaggcaccaa acgaaaaacc tgtaaaacca 2880  
 gaaaactcaa cggataatgg aatgttgaat ccagaaggga atgtggggag tgaccctatg 2940  
 ttagatccag cattagagga agctccagca gtagatcctg tacaagaaaa attagaaaaa 3000  
 tttacagcta gttacggatt aggcttagat agtggttatat tcaatatgga tggaacgatt 3060  
 gaattaagat tgccaagtgg agaagtgata aaaaagaatt tatctgatct catagcg 3117

<210> 47  
 <211> 1431  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 47  
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 gacgtcattg gcgctcttcc aaaatcactg gtaaaagctg ggcacgaagt tgcagtgatt 120  
 ttaccctact atgatatggg agaggctaaa tttggaaatc agattgaaga tgtgcttcat 180  
 tttgaggtga gcggttggtg gcgcagacag tattgtggaa ttaagaaaac agtattaaat 240  
 ggtgtaacct tctactttat tgacaatcaa tattatttct tccgtgggtca tgtttacggg 300  
 gattttgatg acggagaacg ctttgccttt ttccaactgg ctgccattga ggctatggaa 360  
 aggattgact ttattcctga tcttctccat gttcatgact accatacagc tatgattcct 420  
 ttcttggtga aggaaaaata ccgttggatt caagcctatg aggacattga aacagtttta 480  
 accattcata atttagaatt ccaaggacaa ttttcagaag gaatgttggg tgatttggtt 540  
 ggagttggct ttgaacgtta cgctgatggc acccttcgat ggaacaactg tctgaactgg 600  
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 gaagatgttc agattgttct tttgggaact ggcgatccag ctttgaagg agctttctca 1020  
 tggtttgctc agatttacct agacaagcta tcaacaata tcacttttga tgtcaaactt 1080

1028462\_1.TXT

|            |            |            |            |             |             |            |      |
|------------|------------|------------|------------|-------------|-------------|------------|------|
| gctcagga   | aaa        | tctacgctgc | ttgtgacctc | ttcctcatgc  | caagtcgttt  | tgaaccgtgt | 1140 |
| ggcttgtctc | aaatgatggc | tatgcgttat | ggaaccttgc | cattgggtcca | tgaagttgga  |            | 1200 |
| ggcttgcgag | atacagttcg | cgctttcaat | ccaatcgaag | gaagcggtac  | tggcttttagc |            | 1260 |
| tttgacaatc | tatctcctta | ttggttaaat | tggactttcc | aaacagcatt  | ggacttgtat  |            | 1320 |
| agaaaccatc | cagacatttg | gagaaaccta | caaaaacaag | ctatggagag  | tgactttctca |            | 1380 |
| tgggatacag | cctgcaagtc | ataccttgac | ttgtaccata | gtttagttaa  | t           |            | 1431 |

<210> 48  
 <211> 6012  
 <212> DNA  
 <213> Streptococcus pneumoniae

|            |            |            |             |             |            |            |      |
|------------|------------|------------|-------------|-------------|------------|------------|------|
| <400>      | 48         |            |             |             |            |            |      |
| atggaaaagt | at         | tttttggtga | aaaacaagag  | cgtttttcat  | ttagaaaatt | atcagtagga | 60   |
| cttgtatctg | caacgatttc | aagtttattt | tttatgtctg  | tattagctag  | ttcatctgtg |            | 120  |
| gatgctcaag | aaactgcggg | agttcactat | aaatatgtgg  | cagattcaga  | gctatcatca |            | 180  |
| gaagaaaaga | agcagcttgt | ctatgatatt | ccgacatacg  | tggagaatga  | tgatgaaact |            | 240  |
| tattatcttg | tttataagtt | aaattctcaa | aatcaactgg  | cggaattgcc  | aaatactgga |            | 300  |
| agcaagaatg | agaggcaagc | cctagttgct | ggtgctagct  | tagctgctat  | gggaatttta |            | 360  |
| at         | tttttgctg  | tttccaagaa | aaagggttaag | aataaaacgg  | tattacattt | agtattggtt | 420  |
| gcagggatag | gaaatggtgt | cttagtttca | gtccatgctt  | tagaaaatca  | tcttttgcta |            | 480  |
| aattacaata | cggactatga | attgacctct | ggagaaaaat  | tacctcttcc  | taaagagatt |            | 540  |
| tcaggttaca | cttatattgg | atatatcaaa | gagggaaaaa  | cgacttctga  | gtctgaagta |            | 600  |
| agtaatcaaa | agagttcagt | tgccactcct | acaaaacaac  | aaaagggtgga | ttataatgtt |            | 660  |
| acaccgaatt | ttgtagacca | tccatcaaca | gtacaagcta  | ttcaggaaca  | aacacctggt |            | 720  |
| tcttcaacta | agccgacaga | agttcaagta | gttgaaaaac  | ctttctctac  | tgaattaatc |            | 780  |
| aatccaagaa | aagaagagaa | acaatcttca | gattctcaag  | aacaattagc  | cgaacataag |            | 840  |
| aatctagaaa | cgaagaaaga | ggagaagatt | tctccaaaag  | aaaagactgg  | ggtaaataca |            | 900  |
| ttaaatccac | aggatgaagt | tttatcaggt | caattgaaca  | aacctgaact  | cttatatcgt |            | 960  |
| gaggaaacta | tggagacaaa | aatagatttt | caagaagaaa  | ttcaagaaaa  | tcctgattta |            | 1020 |
| gctgaaggaa | ctgtaagagt | aaaacaagaa | ggtaaattag  | gtaagaaagt  | tgaaatcgtc |            | 1080 |
| agaatattct | ctgtaaacia | ggaagaagtt | tcgcgagaaa  | ttgtttcaac  | ttcaacgact |            | 1140 |
| gcgcctagtc | caagaatagt | cgaaaaaggt | actaaaaaaa  | ctcaagttat  | aaaggaacia |            | 1200 |
| cctgagactg | gtgtagaaca | taaggacgta | cagtctggag  | ctattgttga  | acccgcaatt |            | 1260 |
| cagcctgagt | tgcccgaagc | tgtagtaagt | gacaaaggcg  | aaccagaagt  | tcaacctaca |            | 1320 |

## 1028462\_1.TXT

|            |             |             |             |             |             |      |
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| actgtggtaa | gtgataaagg  | tgaaccagag  | caggtagcac  | cgcttccaga  | atataagggg  | 1440 |
| aatattgagc | aagtaaaacc  | tgaaactccg  | gttgagaaga  | ccaaagaaca  | aggtccagaa  | 1500 |
| aaaactgaag | aagttccagt  | aaaaccaaca  | gaagaaacac  | cagtaaatacc | aaatgaaggt  | 1560 |
| actacagaag | gaacctcaat  | tcaagaagca  | gaaaatccag  | ttcaacctgc  | agaagaatca  | 1620 |
| acaacgaatt | cagagaaagt  | atcaccagat  | acatctagca  | aaaatactgg  | ggaagtgtcc  | 1680 |
| agtaatccta | gtgattcgac  | aacctcagtt  | ggagaatcaa  | ataaaccaga  | acataatgac  | 1740 |
| tctaaaaatg | aaaattcaga  | aaaaactgta  | gaagaagttc  | cagtaaatacc | aaatgaaggc  | 1800 |
| acagtagaag | gtacctcaaa  | tcaagaaaca  | gaaaaaccag  | ttcaacctgc  | agaagaaaca  | 1860 |
| caaacaaact | ctgggaaaat  | agctaacgaa  | aatactggag  | aagtatccaa  | taaacctagt  | 1920 |
| gattcaaaac | caccagttga  | agaatcaaat  | caaccagaaa  | aaaacggaac  | tgcaacaaaa  | 1980 |
| ccagaaaatt | caggtaatac  | aacatcagag  | aatggacaaa  | cagaaccaga  | accatcaaac  | 2040 |
| ggaaattcaa | ctgaggatgt  | ttcaaccgaa  | tcaaacacat  | ccaattcaaa  | tggaacgaa   | 2100 |
| gaaatttaac | aagaaaatga  | actagaccct  | gataaaaagg  | tagaagaacc  | agagaaaaca  | 2160 |
| cttgaattaa | gaaatgtttc  | cgacctagag  | ttatacagtt  | tgtcaaatgg  | tacttataaa  | 2220 |
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| tcttcttcat | tcaaagatgt  | atacctacca  | gtagcatcaa  | tatcagagga  | aagaaaaaat  | 2340 |
| gataaaatcc | tttataaaat  | cacagcaaaa  | gtagagaagc  | ttcagcagga  | gatagaaagc  | 2400 |
| agatataaag | ataatthttac | cttctatcta  | gctaagaagg  | gaacagaaga  | aacaacaaac  | 2460 |
| tttacttctt | ttagtaatct  | ggtcaaagct  | ataaaccaaa  | atccctctgg  | aacctatcat  | 2520 |
| ttagcggcca | gcctgaatgc  | taacgaagtg  | gagcttggtc  | ctgatgaaag  | atcctatatc  | 2580 |
| aaggacacct | ttactgggtc  | tttaatcggg  | gaaaaagatg  | gcaagaatta  | tgctatctat  | 2640 |
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| acttcagatc | agactgtggg  | tggaacttgca | ggcctagtag  | accgagatgc  | acagatccaa  | 3060 |
| gatagctatg | ctgaagggtga | tatcaacaat  | gtcaagcact  | ttggtagagt  | cgctggagtg  | 3120 |
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## 1028462\_1.TXT

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## 1028462\_1.TXT

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 <212> DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 50

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| aataatcgtg  | tttcctatat | agatggaaaa  | caagcgacgc | aaaaaacgga  | gaatttgact  | 120  |
| cctgatgagg  | ttagcaagcg | tgaaggaatc  | aatgctgagc | aaatcgtcac  | caagataaca  | 180  |
| gaccaaggct  | atgtcacttc | acatggcgac  | cactatcatt | attacaatgg  | taagggttcct | 240  |
| tatgacgcta  | tcatcagtga | agaattactc  | atgaaagatc | caaaactataa | gctaaaagat  | 300  |
| gaggatattg  | ttaatgaggt | caaggggtgga | tatgttatca | aggtagatgg  | aaaatactat  | 360  |
| gtttacctta  | aggatgctgc | ccacgcggat  | aacgtccgta | caaaagagga  | aatcaatcga  | 420  |
| caaaaacaag  | agcatagtca | acatcgtgaa  | ggtggaactc | caagaaacga  | tggtgctggt  | 480  |
| gccttggcac  | gttcgcaagg | acgctatact  | acagatgatg | gttatatctt  | taatgcttct  | 540  |
| gatatcatag  | aggatactgg | tgatgcttat  | atcgttcctc | atggagatca  | ttaccattac  | 600  |
| attcctaaga  | atgagttatc | agctagcgag  | ttggctgctg | cagaagcctt  | cctatctggt  | 660  |
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| acaaactggg  | taccttctgt | aagcaatcca  | ggaactacaa | atactaacac  | aagcaacaac  | 780  |
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| ccggaaccta  | gtccaggccc | gcaacctgca  | ccaaatctta | aaatagactc  | aaattcttct  | 1140 |
| ttggtttagtc | agctggtagc | aaaagttggg  | gaaggatatg | tattcgaaga  | aaagggcatc  | 1200 |
| tctcgttatg  | tctttgcgaa | agatttacca  | tctgaaactg | ttaaaaatct  | tgaaagcaag  | 1260 |
| ttatcaaaac  | aagagagtgt | ttcacacact  | ttaactgcta | aaaaagaaaa  | tgttgctcct  | 1320 |
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## 1028462\_1.TXT

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<213> Streptococcus pneumoniae

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## 1028462\_1.TXT

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| agtgaatttt | tcgctacaga | tgataaaggg  | aaatttattc | atgagcatga | tgtcagaaat  | 1200 |
| tggttagata | ctctatcaag | caatgaaaaa  | tatccatttt | caaccaaaga | actccgtaat  | 1260 |
| gaactcaagc | atactttttg | gcttttagaa  | cgtgtcgctt | cggccaaagc | attaaaagcc  | 1320 |
| ctactagaag | aacacccaat | ctatgaaaac  | tatgagatcg | ttctagctgc | tggtgacgga  | 1380 |
| cgtatgtccg | aagaagacga | taaagtcaaa  | ctcaaatcct | tggaacttgg | tagaaaagcg  | 1440 |
| atagcagaga | atgacaaaac | cattacccta  | tccgttggtc | agctgacgac | aggtgtcact  | 1500 |
| atccctgaat | ggacaggtgt | attgatgtta  | tcaaatttga | aatcaccagc | tcttttatatg | 1560 |
| caggccgcct | tccgtgctca | aaatccttac  | tcatggagcg | ataacaaagg | aaatcacttt  | 1620 |
| cgcaaagaaa | gagcctatgt | atttgacttt  | gcgccggaaa | gaaccttgat | tctctttgat  | 1680 |
| gagtttgcca | acaacttatt | gcttgtaact  | gcagctggta | gaggaacttc | agctacacgc  | 1740 |
| gaagaaaata | ttagagaatt | attaaacttc  | tttccaatta | ttgccgaaga | ccgtgctggg  | 1800 |
| aagatggttg | aaattgatgc | aaaggcagtt  | ctaaccactc | ctcgccagat | aaaagctaga  | 1860 |
| gaagtcttta | aacgaggttt | tatgtccaat  | ctcttatttg | ataatattag | tggtattttc  | 1920 |
| caagcaagtc | aaacagtttt | agatatttta  | aatgagctgc | cagttgaaaa | ggaaggggaag | 1980 |
| gtacaagata | gttctgattt | attagatttt  | tcagatgtta | cagtcgatga | tgagggaat   | 2040 |
| gcagtagtag | accatgaaat | tgtagttaat  | cagcaaagtc | gacttttttg | tgaaaaagtt  | 2100 |
| tatggacttg | gtgaatctgt | tgctgagtta  | gtcacaaaag | atgaggaacg | aactcaaaaa  | 2160 |
| cagctggtca | atgacttgag | taagaccggt  | tcttcagtga | ttgtagagga | attgaaagca  | 2220 |
| gattattctc | taaaaacaag | ggaaactgag  | caaattaaga | aacaaattac | agcaacactt  | 2280 |
| gagaatgaaa | ttcgaaaaaa | tgatatcgaa  | agaaaaattt | ctgaagctca | tatcaagcaa  | 2340 |
| gagttgcaac | agcagctcaa | agaagcaaat  | gataaagcgc | aaaaagataa | gattcaagaa  | 2400 |
| gatttggaag | aacgttttag | agaaaataaa  | ctcattcata | aagaaaaact | agaacaaaca  | 2460 |
| ctcaaaaaag | aagtggaaaa | aatgcctgag  | aaatttatcg | aacagggttg | gataaaacgt  | 2520 |
| gtggaacagt | tgaaacaatc | agctcaagat  | gaaattcgtg | accattttac | agggtttgca  | 2580 |
| agaacaattc | caagttttat | tatggccttac | ggtgatcaaa | ctctaact   | tgataatttt  | 2640 |
| gatgcctttg | ttcctgaaca | tgttttttat  | gaagtaacag | ggattacgat | tgatcagttt  | 2700 |
| agatatattg | gagatgggtg | gcaggatttt  | gcagggcatc | tctttgataa | agcaacattt  | 2760 |
| gacgaagcta | ttcaagaatt | tcttcgcaag  | aaaaaggagt | tggcggatta | ttttaagat   | 2820 |
| caaaaagaag | acatttttga | ctatatcca   | ccgcagaaga | ccaaccaa   | tttactcct   | 2880 |
| aaacgagtgg | tgaaaaggat | ggtagatgat  | ttggaaaagg | aaaatccagg | gatttttgat  | 2940 |

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|   |      |
|---|------|
| gatccatcta agacttttat tgatttatat atgaagtcag gcctctatat tgcagaactt | 3000 |
| gtgaagcggg tatataatag caatggcttg aaagaggcct ttccaaatcc tgaagaacgc | 3060 |
| ttaaaacata ttttgaaaa gcaagtttat ggatttgctc cgtctgagat tatctataac  | 3120 |
| atttccacta attttatatt tggcaatctt tctaaagata tcagtaggaa gaattttggt | 3180 |
| ttagcagata ccattccagc ggctaaagaa gggagcattc aaaagttggg tgattcctat | 3240 |
| tttgaata at   | 3252 |

<210> 52  
 <211> 702  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |     |
|--|-----|
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| atgaccaagg aaggttacga agttgtaact gcttttaatg gtcgtgaagc gctagagcaa  | 120 |
| tttgaagcag agcaaccaga tattattatt ctggatttga tgcttccaga aattgatggg  | 180 |
| ttagaagttg ctaagaccat tcgtaagaca agcagtgtgc ccattcttat gctttcagcc  | 240 |
| aaagatagtg aatttgataa gggtatcggg ttggaacttg gggcagatga ctatgtaaca  | 300 |
| aaacccttct ccaatcgtga gttgcaggcg cgtgttaaag ctcttctgcg tcgttctcaa  | 360 |
| cctatgccag tagatgggtca ggaagcagat agtaaacctc aacctatcca aattggggat | 420 |
| ttagaaattg ttccagacgc ctacgtggct aaaaaatatg gcgaagaact agacttaacc  | 480 |
| catcgtgaat ttgagctttt gtatcattta gcatcgcata cagggtcaagt catcacgcgc | 540 |
| gaacacttgc ttgagactgt ctgggggttat gactattttg gtgatgtccg tacagttgat | 600 |
| gtgactgtac gacgtctgcg tgagaagatt gaagatacgc ccagccgacc agagtatatc  | 660 |
| ttgacgcgcc gtggtgtagg gtattacatg agaaataatg ct                     | 702 |

<210> 53  
 <211> 2163  
 <212> DNA  
 <213> Streptococcus pneumoniae

|   |     |
|---|-----|
| <400> 53  |     |
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| gccaaagcag aaacgattaa gattgtttct gataccgcct atgcaccttt tgagtttaaa | 120 |
| gattcagatc aaacttataa aggaattgat gttgacatta ttaacaaagt cgctgagatt | 180 |
| aaaggctgga acattcagat gtcctatcct ggatttgacg cagcagtcaa tgcggttcaa | 240 |
| gctgggcaag ccgacgctat catggcaggg atgacaaaga ctaaagaacg tgaaaaagtc | 300 |
| ttcaccatgt ctgatactta ctatgatata aaagttgtca ttgctactac aaagtcacac | 360 |

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|                                   |                                   |      |
|-----------------------------------|-----------------------------------|------|
| aaaattagca agtacgacca attaactggc  | aaaaccggtg gtgttaaaaa cggaactgcc  | 420  |
| gctcaacggt tccttgaaac aatcaaagat  | aaatacggct ttactattaa aacatttgac  | 480  |
| actggtgatt taatgaacaa cagcttgagt  | gctggtgcc tcatgcat gatggatgac     | 540  |
| aaacctgtta tcgaatatgc cattaaccaa  | ggtcaagacc tccatattga aatggatggt  | 600  |
| gaagctgtag gaagttttgc tttcgggtgtg | aaaaaaggaa gtaaatacga gcacctggtt  | 660  |
| actgaattta accaagcctt gtctgaaatg  | aaaaaagatg gtagtcttga taaaattatc  | 720  |
| aagaaatgga ctgcttcac atcttcagca   | gtgccaaacta caactactct cgcaggatta | 780  |
| aaagctattc ctgttaaggc taaatatatc  | attgccagcg attcttcttt tgcccccttt  | 840  |
| gttttccaaa attcaagcaa ccaatacact  | ggtattgata tggaattgat taaggcaatc  | 900  |
| gctaaagacc aaggttttga aattgaaatc  | accaaccctg gttttgatgc tgctatcagt  | 960  |
| gctgtccaag ctggtcaagc cgatggtatc  | atcgctggta tgtctgtcac agatgctcgt  | 1020 |
| aaggcaactt ttgacttctc agaatcatac  | tacactgcta ataccattct tgggtgtcaaa | 1080 |
| gaatcaagca atattgcttc ttatgaagat  | ctaaaaggaa agacagtcgg tgttaaaaaac | 1140 |
| ggaactgctt ctcaaacctt cctaacagaa  | aatcaaagca aatacggcta caaaatcaaa  | 1200 |
| acctttgctg atggttcttc aatgtatgac  | agtttaacaa ctggtgccat tgatgccgtt  | 1260 |
| atggatgatg aacctgttct caaatattct  | atcagccaag gtcaaaaatt gaaaactcca  | 1320 |
| atctctggaa ctccaatcgg tgaacagcc   | tttgccgtta aaaaaggagc aaatccagaa  | 1380 |
| ctgattgaaa tgttcaacaa cggacttgca  | aaccttaaaag caaacggtga attccaaaag | 1440 |
| attcttgaca aatacctagc tagcgaatct  | tcaactgctt caacaagtac tgttgacgaa  | 1500 |
| acaacgctct ggggcttgct tcaaaacaac  | tacaaacaac tccttagcgg tcttggtatc  | 1560 |
| actcttgctc tagctcttat ctcatctgct  | attgccattg tcatcggaat tatcttcggt  | 1620 |
| atgttttagcg ttagcccata caaatctctt | cgcgtcatct ctgagatttt cgttgacgtt  | 1680 |
| attcgtggta ttccattgat gattcttgca  | gccttcatct tctggggaat tccaaacttc  | 1740 |
| atcgagtcta tcacaggcca acaaagccca  | attaacgact ttgtagctgg aaccattgcc  | 1800 |
| ctctcactca atgaggctgc ttatatcgt   | gaaatcgctt gtggtggtat tcaggccgtt  | 1860 |
| ccagttggcc aaatggaagc cagccgaagc  | ttgggtatct cttatggaaa aaccatgcgt  | 1920 |
| aagattatct tgccacaagc aactaaattg  | atgttgccaa actttgtcaa ccaattcggt  | 1980 |
| atcgctctta aagatacaac tatcgatatc  | gctatcggtt tgggtgaact cttccaaact  | 2040 |
| ggtaagatta tcattgctcg taactaccaa  | agtttcaaga tgtatgcaat ccttgctatc  | 2100 |
| ttctatcttg taattatcac acttttgact  | agactagcga aacgcttaga aaagaggatt  | 2160 |
| cgt                               |                                   | 2163 |

<210> 54  
 <211> 1569  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 54  
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 gaggccgacg ttgccttgcc tgttgtaaag gactttatca agaaagttcg tgagcgtgca 180  
 gtcgggcatg aggtcattga tacacttaat cctgcgcaac agattattaa aatcgttgat 240  
 gaggaattga cagccgtttt aggttctgat acggcagaaa ttatcaagtc acctaagatt 300  
 ccaaccatca tcatgatggg tggtttacaa ggggctggta aaacaacctt tgctggtaaa 360  
 ttggccaaca aactcaagaa agaagaaaat gctcgtcctt tgatgattgc ggcggatatt 420  
 tatcgtccag ctgccattga ccagcttaag accttgggac aacagattga tgtgcctgtc 480  
 ttgtcacttg gaacagaagt accagctggt gagattgtac gtcaagggtt ggagcaagcc 540  
 caaactaatc ataacgacta tgtcttgatt gatactgcgg gtcgtttgca gattgatgag 600  
 ctctcatga atgagcttcg tgatgtgaaa gcattggctc aaccaaataa aatcttgctt 660  
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 ttggaagtga ctgggggtcat ccttaccaag attgatggcg atactcgtgg tgggtgctgct 780  
 ctgtctgttc gtcacattac tggaaaacca atcaagttca ctggtacagg tgaaaagatt 840  
 acggacattg aaaccttcca ccagaccgc atgtctagcc gtatccttgg tatgggggat 900  
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 gctgagaaga tgcgcgaaaa cacctttgat tttaatgatt tcatcgatca attagatcag 1020  
 gtgcaaaata tggggccgat ggaagacttg ctcaagatga ttccaggatg ggccaacaat 1080  
 ccagcccttc aaaacatgaa ggtggatgaa cgccagattg ctcgtaaacg tgccattgtg 1140  
 tcttcgatga cacctgaaga gcgtgaaaac ccagatttgt taaatccaag ccgtcgccgt 1200  
 cgtattgctg ctggttcttg aaatacattc gtcgaagtca ataaattcat caaggacttt 1260  
 aaccaggcta aacagctcat gcagggtggt atgtctgggg atatgaataa aatgatgaag 1320  
 caaatgggga ttaatccaaa taaccttcct aaaaatatgc caaatatggg aggaatggat 1380  
 atgtctgccc ttgaaggaat gatgggacaa ggcggtatgc ctgacttatc agctctcgga 1440  
 ggagcaggaa tgccagatat gagccagatg tttggtggcg gtttgaaagg taaaattggt 1500  
 gaatttgcca tgaaacagtc catgaaacgt atggctaaca aaatgaagaa agcgaagaag 1560  
 aaacgcaag 1569

<210> 55  
 <211> 699

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 55

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atggcctaag cagcttttaga ggcaggagca gtgggcattc gcgcaaattc tgtgcgtgat 180
attaaagcaa ttcagaaagt agtagattta ccaataattg gaattatcaa aagggtattat 240
ccacctcaag aaccatatat tactgctacg atgaaagaag tagatgaact tgtagaatgc 300
ggaacaacag tcattgcatt tgatgcaact ttaagaccaa gatatgatgg cttagtTgtc 360
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ttatcaggTT acacaagtac aagtgtacaa tcagatgagc ctgattttga actaatgaaa 540
aaattggctg attttaatat tccggtTaatt gccgaaggaa aaattcatta tccagaacaa 600
ttaaaaaaag cttatagttt aggtgttacc agtgtagtca ttggtggagc gattacacgt 660
ccaaaagaaa ttgctcagcg atttattaat gTcatcaaa 699

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&lt;210&gt; 56

&lt;211&gt; 1164

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 56

```

atgagatatt taactgcagg agaatcacac ggccccgTc taacagctat tattgaggga 60
attccagctg gacttccatt gacagctgag gatatcaatg aggaccttag acgccgTcag 120
ggTggctacg gTcgtggTgg tcgtatgaag attgagaatg accaggTtgt ctttactTcg 180
ggcgTtcgcc acgggaagac gacaggggTcg cctattacta tggatgtcat caataaggac 240
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tttgatgatt tgcgaaattc tttggagcgt tcatcagctc gtgaaaccac catgcgggTg 420
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gTcgtggTct ttggtggcaa ggaaatcgat gTtcctgaaa atctgacagt cgctgaaatt 540
aagcaaagag ctgccagTc tgaagTttct attgtcaacc aagaacgaga acaggaaatc 600
aaggactata ttgaccaaT caaacgtgat ggtgatacca tcggTggggT tgtggagaca 660
gTcgtcgag gcgTtccagT tggTctTggT tcctatgtcc aatgggtag aaaattggat 720
gcaagattgg ctcaagctgt tgtctctatc aatgcctTta aaggggTgga atttggtctt 780
ggctttgagg ctggttatcg taaaggcagc caagTtatgg atgaaattct ctggtctaaa 840

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 actgctcttc cagctgcagg aatgggtcatg gaagcagttg tagcaacggt tctggcgcaa 1080  
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 caccgagact atacaaagaa ctat 1164

<210> 57  
 <211> 1170  
 <212> DNA  
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 gtgcagggtc aggaaggaaa ctttcttggg actgcctacc tttctcagca aaacaagggc 180  
 ttgggctggt ttatcagcaa agacaagggt gccttcaatc aagctttctt tgaaacgttg 240  
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 gccttttagac aggttttccc tgagggtttta ggagcttatg agaaaatccg ctttaaggggt 480  
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 aatatgtttt cctacacagc ggctttttca gtagctgcgg ccatgggagg agctagccat 720  
 acaacttctg ttgatctagc caaacgttca cgagaattgt ctcaagcgca ttttcaggca 780  
 aatgggctca gcacagacga gcatcgtttt atagtcatgg atgtctttga gtatttcaaa 840  
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 cgtcagaaat ttacagaaca aattgataaa ggttttgcag gaagaagtta ccagatttta 1080  
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 ctcaagggtga ttagtatgaa ggtagtaaa 1170

<210> 58  
 <211> 1284  
 <212> DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 58

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cgtagccgtg cgggaaactt tactttcgaa cagatggaag aaggcgtgca gtttgcggcc    180
aagtatggtg ccaagggtcta tgtagcggct aatatggtta tgcacgaagg aaatgaagct    240
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cgtgtcgttt tagcgcgtga ggtttcaatg gaagaattag ctgagatccg caaacgtaca    480
gatgttgaaa ttgaagcctt tgtccatgga gctatgtgta tttcatactc tggacgttgt    540
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ggaaccagcg tcacagttcg agct                                     1284

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&lt;210&gt; 59

&lt;211&gt; 840

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 59

```

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aaggctaagg atggagaaga agcctatcgt gcagtgttag aagccttgaa ggctgggttat    120
cgtcatattg atacggcggc gatattatcag aatgaagaaa gtgttggtca agcaatcaaa    180
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| aaaactcgca atgcggaagt ttggagagcg atggaagacc tctatcaaga agggaaaatc  | 420 |
| cgtgctatcg gcgtttagcaa ttttcttccc catcatttgg atgccttgct tgaaactgca | 480 |
| actatcgttc ctgcggtcaa tcaagttcgc ttggcgccag gtgtgtatca agatcaagtc  | 540 |
| gtagcttact gtcgtgaaaa gggaaatttta ttggaagctt gggggccttt tggacaagga | 600 |
| gaactgtttg atagcaagca agtccaagaa atagcagcaa atcacggaaa atcggttgct  | 660 |
| cagatagcct tggcctggag cttggcagaa ggatttttac cacttccaaa atctgtcaca  | 720 |
| acctctcgta ttcaagctaa tcttgattgc tttggaattg aactgagtca tgaggagaga  | 780 |
| gaaaccttaa aaacgattgc tgttcaatcg ggtgctccac gagttgatga tgtggatttc  | 840 |

<210> 60  
 <211> 1653  
 <212> DNA  
 <213> Streptococcus pneumoniae

|   |      |
|---|------|
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| ttagaaaaag taaaaggcta tgatgaagtt ctgaaagaag atgaggcagt agttcgcact   | 120  |
| cctgcaaattg aaccttcaac tgaagaactc atggctgatt ccttgtcaac ggtagaggag  | 180  |
| attatgagaa aagctcctac cgtgcctact cacccaagtc aagggtgtacc agcttctcca  | 240  |
| gcagatgaga ttcaaagaga aactcctggt gttccaagtc atccaagtca agatgtacct   | 300  |
| tcttctccag cggaagaaaag tggatcaaga ccagggtccag gtcctgttag acctaagaaa | 360  |
| cttgaaagag aatacaatga aacccaaca agggtagctg tttcctatac gacggcagag    | 420  |
| aaaaaagcag aacaagcagg tccagaaaca cctacgcctg ctacagaaac agtggatatc   | 480  |
| atcagagata catcacgtcg tagccgtaga gaaggagcaa aaccggttaa gcctaagaaa   | 540  |
| gagaagaagt cacatgtgaa agcttttgtg atttcattcc ttgtattcct tgccttgctc   | 600  |
| tcagcaggtg gttacttttg ttaccagtac gtgctagatt ccttattacc tatcgatgct   | 660  |
| aattctaaga aatatgtgac ggttggaatt ccagaagggt caaacgttca agaaatcggt   | 720  |
| acgacgcttg aaaaagctgg tttggtaaag catgggtctga tttttagttt ttatgccaag  | 780  |
| tataaaaatt ataccgactt gaaagcaggt tactacaatt tgcaaaagag tatgagtaca   | 840  |
| gaagacttac tcaaagagtt gcaaaaagggt ggaacagatg aaccgcaaga acctgtactt  | 900  |
| gcgactttga caattccaga aggttatacc ttggatcaga ttgctcaagc tgtgggtcaa   | 960  |
| ttgcaagggtg acttcaaaga gtctttgaca gcggaggctt tcttggctaa agttcaagat  | 1020 |
| gagacgttta tcagtcaagc agtagcgaaa taccctactt tactggaaaag tttgcctgta  | 1080 |
| aaagacagcg gtgcgcgtta tcgttttgaa ggataccttt tcccagctac atactctatc   | 1140 |



1028462\_1.TXT

|   |      |
|---|------|
| aaggaaagca caactattga gagcttgatt gatgagatgt tagctgctat ggataagaac | 1200 |
| ctatctcctt actatagtac tatcaaactt aaaaacttga ctgtcaatga gttgttgacc | 1260 |
| attgcttcct tggtcgaaaa agaaggtgcc aagacagaag atcgtaagct cattgcaggt | 1320 |
| gtattctaca atcgtttgaa tcgtgatatg ccacttcaaa gtaatattgc aatcttgat  | 1380 |
| gccaaggaa aactggggca aaatatcagt ctagctgagg atgttgcgat tgataccaac  | 1440 |
| attgattcac cttataatgt ttataaaaat gtaggtctca tgcctgggcc agtcgatagt | 1500 |
| ccaagtctgg atgcgattga gtcaagcatc aatcaaacta agagcgataa cctctacttt | 1560 |
| gtagcagatg tcacagaagg caaggtctac tatgctaaca atcaagaaga ccacgaccgc | 1620 |
| aatgtcgctg aacatgtcaa cagcaaatta aac                              | 1653 |

<210> 61  
 <211> 615  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |     |
|--|-----|
| <400> 61   |     |
| atgaaacaag aacgatttcc attggtgtca gatgacgagg tcatgttgac tgaaatgcca  | 60  |
| gtcatgaatc tctatgatga gtctgatctg atcagtaata tcaaggggtga gtatcgagat | 120 |
| aaaaattatt tagaatgggc tcctattgct gaagaaaaac cagtaaaacc gattgaaaag  | 180 |
| caagtcgaaa aacctaaaaa ggctccttta ggggttaaaa aagaaggaaa gagctatgcg  | 240 |
| gaggtggcgc gtgaagaagc gcgtgcggac ttgaaaaaga aacgctctgc taactaccta  | 300 |
| actcaggatt tcagccttgc gagacgtcat tctcagccca gtctagttag acagggcaat  | 360 |
| caaccgacag ctcctttcca aaaggaaaat cctggtgaat ttgtcaaata tagccaaaaa  | 420 |
| ttgaccagcgt ctcattatat cttggcggaa gaagttcatt ctatccctac caagaatgaa | 480 |
| gaagtgtcag cacctgctcc aaagaaaaac aattatgatt ttctaaagaa gagccaaatc  | 540 |
| tacaataaaa aaagtaaaca aacagaacaa gaacgtcggg ttgcccaaga gttgaatctg  | 600 |
| accagaatga cagaa   | 615 |

<210> 62  
 <211> 1956  
 <212> DNA  
 <213> Streptococcus pneumoniae

|   |     |
|---|-----|
| <400> 62  |     |
| atgaaaaagt ctaagagcaa atatctaacc ttggcaggtc ttgtcctggg tacaggagtt | 60  |
| ttattgagcg cgtgtggaaa ttctagcacg gcgtcaaaaa cctacaacta tgtttattca | 120 |
| agtgatccat ctagcttgaa ctatctagca gaaaaccgcg cagcaacatc cgatattggt | 180 |
| gcaaatttgg tagacggggt attagaaaat gaccaatatg ggaatattat tccatcatta | 240 |

1028462\_1.TXT

|   |      |
|---|------|
| gcagaggatt ggactgtttc tcaggacggt ttgacctata cctacaaact tcgtaaggat   | 300  |
| gccaaagtggg ttactttctga gggagaagaa tatgcgcttg taactgcccc ggattttgtg | 360  |
| acagggtttgc aatatgcagc tgataaaaaa tcagaagcct tgtatctagt gcaggactct  | 420  |
| gttgctgggtt tggatgacta tatcactggg aaaacaagcg acttttcaac tgtcgggtgtc | 480  |
| aaggcacttg atgaccaaac ggttcaatat acttttggtta aaccagaact ttactggaat  | 540  |
| tcaaaaacac ttgcaacgat actttttcct gttaatgcag atttcctgaa atcaaaaggg   | 600  |
| gatgattttg ggaaggcgga tccatctagt attttgtaca atggaccttt cttgatgaaa   | 660  |
| gcacttgtct caaaatctgc tattgaatat aagaaaaacc ctaattactg ggatgctaag   | 720  |
| aatgtctttg tagacgatgt gaaattgacc tactatgatg gtagcgacca agaactactg   | 780  |
| gaacgtaatt ttacagctgg tgcttatact acggctcgtc tttttcctaa cagctccagc   | 840  |
| tatgaaggga ttaaagaaaa atacaaaaac aatatcatct atagtatgca aaattcaact   | 900  |
| tcatattttc ttaattttta cctagatagg aagtcttaca attatacttc taaaacaagt   | 960  |
| gacattgaaa agaaatcgac tcaggaagca gttctcaata aaaacttccg tcaggctatc   | 1020 |
| aattttgctt ttgacagaac atcttatggg gctcagtctg aagggaagaa aggtgcaaca   | 1080 |
| aagattttgc gtaacctagt ggttcctcca aactttgtca gtatcaaggg aaaagacttt   | 1140 |
| ggtgaagttg tagcctctaa gatggtcaac tatggtaagg aatggcaagg tatcaacttt   | 1200 |
| gcggatggtc aagaccctta ctacaatcct gagaaagcca aggctaagtt tgcggaagct   | 1260 |
| aagaaagaac tcgaagcaaa ggggtgttcaa ttcccaatcc acttggataa gactgtggaa  | 1320 |
| gtaacagata aagtaggcat acaaggagtt agttctatca aacaatcaat tgaatctggt   | 1380 |
| ttaggttctg ataatgtagt gattgacatt cagcaattaa catcagatga gtttgacagt   | 1440 |
| tcaggctact ttgctcaaac agctgctcag aaagattatg atttatatca tggcggttgg   | 1500 |
| ggacctgatt atcaagacct gtcaacctat ctcgatattt ttaatactaa tagtggagga   | 1560 |
| tttctgcaaa atcttggact agagcctggg gagggcaatg acaaggctaa ggcagttgga   | 1620 |
| ctggatgtct atactcaaat gttggaagaa gctaataaag agcaagatcc ggccaaacgt   | 1680 |
| tatgagaaat atgctgatat tcaagcttgg ttgattgata gttctttagt tcttccaagt   | 1740 |
| gtttcgcgtg ggggaacacc atcattgaga agaaccgtac catttgctgc tgcctatggt   | 1800 |
| ttaaccggta caaaaggggt tgaatcatat aaatacctca aagtacaaga taagattgtc   | 1860 |
| acaacagacg aatatgcaaa agccagagaa aaatggttga aagaaaaaga agaatccaat   | 1920 |
| aaaaaagccc aagaagaatt ggcaaaacat gtcaaa                             | 1956 |

<210> 63  
 <211> 1518  
 <212> DNA  
 <213> Streptococcus pneumoniae

## 1028462\_1.TXT

```

<400> 63
gtggaacagc attcagatgt ctgttacatt ttttatagga gagaaagatt gaaaacaaaa 60
attggattag caagtatctg ttacttaggc ttggcaacta gtcatgtcgc tgcaaatgaa 120
actgaagtag caaaaacttc gcaggataca acgacagctt caagtagttc agagcaaaat 180
cagtcttcta ataaaacgca aacgagcgca gaagtacaga ctaatgctgc tgccactgg 240
gatgggggatt attatgtaaa ggatgatggt tctaaagctc aaagtgaatg gatttttgac 300
aactactata aggcttggtt ttatattaat tcagatggtc gttactcgca gaatgaatgg 360
catggaaatt actacctgaa atcaggtgga tatatggccc aaaacgagtg gatctatgac 420
agtaattaca agagttggtt ttatctcaag tcagatgggg cttatgctca tcaagaatgg 480
caattgattg gaaataagtg gtactacttc aagaagtggg gttacatggc taaaagccaa 540
tggcaaggaa gttatttctt gaatggtcaa ggagctatga tgcaaatga atggctctat 600
gatccagcct attctgctta tttttatcta aaatccgatg gaacttatgc taaccaagag 660
tggcaaaaag tgggcggcaa atggtactat ttcaagaagt ggggctatat ggctcggaat 720
gagtggcaag gcaactacta ttgactgga agtggtgcca tggcgactga cgaagtgatt 780
atggatggtg ctcgctatat ctttgcggcc tctggtgagc tcaaagaaaa aaaagatttg 840
aatgtcggct gggttcacag agatggtaag cgctatttct ttaataatag agaagaacaa 900
gtgggaaccg aacatgctaa gaaagtcatt gatattagtg agcacaatgg tcgtatcaat 960
gattggaaaa aggttattga tgagaacgaa gtggatggtg tcattgttcg tctaggttat 1020
agcggtaaaag aagacaagga attggcgcac aacattaagg agttaaacg tctgggaatt 1080
ccttatggtg tctatctcta tacctatgct gaaaatgaga ccgatgctga gagtgcgct 1140
aaacagacca ttgaacttat aaagaaatac aatatgaacc tgtcttacct tatctattat 1200
gatgttgaga attgggaata tgtaaataag agcaagagag ctccaagtga tacaggcact 1260
tgggttaaaa tcatcaacaa gtacatggac acgatgaagc aggcgggtta tcaaatgtg 1320
tatgtctata gctatcgtag ttattacag acgcgtttta aacaccaga tattttaaaa 1380
catgtaaact gggtagcggc ctatacgaat gctttagaat gggaaaacc tcattattca 1440
ggaaaaaaag gttggcaata tacctcttct gaatacatga aaggaatcca agggcgcgta 1500
gatgtcagcg tttggtat 1518

```

```

<210> 64
<211> 474
<212> DNA
<213> Streptococcus pneumoniae

```

```

<400> 64
atggcaaaag aaccgtggca agaagatatc tatgatcaag aagaatcaag agcagagcgt 60

```

## 1028462\_1.TXT

|   |     |
|---|-----|
| cggcatcgaa accacggagg ggctgatagg atggctaatac gtatTTTTgac gatcctagct | 120 |
| agtatTTTTct ttgtaattgt ggtgggtgatg gtcatcgttc tcatctatct atcatcgggg | 180 |
| gggagtaatc gcacagcagc cttaaaaggc tttcatgatt ctgatgccag tgtagtacaa   | 240 |
| atctcatctt caagtagttc tcagcctgag cagagttcag agccagaatc tacttctagt   | 300 |
| agttcagaag aagctgctaa tcctgaagga acgattaaag ttctcgcagg agaaggggaa   | 360 |
| gcagctattg ccgctcgtgc aggaatctcc attgctcagt tagaggcctt gaatcctggg   | 420 |
| cacatggcta caggatcttg gtttgctaata ccaggtgatg ttataaaaaat aaaa       | 474 |

<210> 65  
 <211> 786  
 <212> DNA  
 <213> Streptococcus pneumoniae

|   |     |
|---|-----|
| <400> 65<br>atgccaatTA catcattaga aataaaggac aagactTTTT gaactcgatt cagaggTTTT | 60  |
| gatccagaag aagtcgatga atTTTTtagat attgtggttc gtgattacga agatcttgtg            | 120 |
| cgtgcgaatc atgataaaaa ttTgcgtatt aagagTTTTag aagagcgttt gtcttacttt            | 180 |
| gatgaaataa aagattcatt gagccagtct gtattgattg ctcaggatac agctgagaga             | 240 |
| gtgaaacagg cggcgcatga acgttcaaac aatatcattc atcaagcaga gcaagatgcg             | 300 |
| caacgcttgt tggaagaagc taaatataag gcaaacgaga ttcttcgtca agcaactgat             | 360 |
| aatgctaaga aagtcgctgt tgaaacagaa gaattgaaga acaagagccg tgtcttccac             | 420 |
| caacgtctca aatctacaat tgagagtcag ttggctattg ttgaatcttc agattgggaa             | 480 |
| gatattctcc gtccaacagc tacttatctt caaaccagtg atgaagcctt taaagaagtg             | 540 |
| gttagcgaag tacttggaga accgattcca gctccaattg aagaagaacc aattgatatg             | 600 |
| acacgtcagt tctctcaagc agaaatggca gaattacaag ctcgtattga ggtagccgat             | 660 |
| aaagaattgt ctgaatttga agctcagatt aaacaggaag tggaagctcc aactcctgta             | 720 |
| gtgagtcctc aagttgaaga agagcctctg ctcatccagt tggcccaatg tatgaagaac             | 780 |
| cagaag  | 786 |

<210> 66  
 <211> 537  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |     |
|--|-----|
| <400> 66<br>atgtctTTTaa aagatagatt cgatagattt atagattatt ttacggagga tgaggattca | 60  |
| agtctccctt atgaaaaaag agatgagcct gtgtttactt cagtaaattc ttcacaggaa              | 120 |
| ccggctctcc caatgaatca accttcacag tcggctggca caaaagagaa caatatcacc              | 180 |
| agacttcatg caagacaaca ggaattggca aatcagagtc agcgtgcaac ggataaggtc              | 240 |

## 1028462\_1.TXT

|            |            |            |            |             |             |     |
|------------|------------|------------|------------|-------------|-------------|-----|
| attatagatg | ttcgttatcc | tagaaaatat | gaggatgcaa | cagaaattgt  | tgattttattg | 300 |
| gcaggaaacg | aaagtatctt | gattgatttt | cagtatatga | cagagggtgca | ggctcgtcgt  | 360 |
| tgtttgact  | atttgatgg  | agcttgtcat | gttttagctg | gaaatttgaa  | aaaggtagct  | 420 |
| tctaccatgt | atttgttgac | accagtgaac | gttattgtaa | atgttgaaga  | tatccgttta  | 480 |
| ccagatgaag | atcaacaggg | tgagttcgg  | tttgatatga | agcgaaatag  | agtacga     | 537 |

<210> 67  
 <211> 915  
 <212> DNA  
 <213> Streptococcus pneumoniae

|             |   |
|-------------|---|
| <400> 67    |   |
| atgtcagatt  | tgaaaaaata cgaagggtgtc attccagcct tctacgcatg ttatgatgat 60  |
| caaggagaag  | taagcccaga acgtacgcgt gccttggttc aatacttcat tgataaagggt 120 |
| gttcaagggtc | tttatgtcaa tggttcttct ggtgaatgta tctaccaaag cgttgaagat 180  |
| cgcaagttga  | ttttggaaga agtcatggcg gtagccaaag gtaaattgac cattattgcc 240  |
| catgttgctt  | gcaataatac taaagatagt atggaacttg ctcgccatgc tgaaagcttg 300  |
| ggagtagatg  | ctattgcaac gattccacca atttatttcc gcttgccaga atactcagtt 360  |
| gccaaatact  | ggaacgatat cagttctgca gctccaaaca cagactacgt gatttacaac 420  |
| attcctcaat  | tggcaggggt tgctttgact ccaagccttt acacagaaat gttgaaaaat 480  |
| cctcgtgtta  | tcggtgtgaa gaactcttct atgccagttc aagatatcca aacctttgtc 540  |
| agccttggtg  | gagaagacca tatcgtcttt aatggctctg atgagcagtt cctaggagga 600  |
| cgcctcatgg  | gggctagggc tggtatcggg ggtacttatg gtgctatgcc agaactcttc 660  |
| ttgaaactca  | atcagttgat tgcggataag gacctagaaa cagcgcgtga attgcagtat 720  |
| gctatcaacg  | caatcattgg taaactcact tctgctcatg gaaatatgta cgggtgtcatc 780 |
| aaagaagtct  | tgaaaatcaa tgaaggcttg aatattggat ctgttcgttc accattgaca 840  |
| ccagtgactg  | aagaagatcg tccagttgta gaagcggctg ctgccttgat tcgtgaaacc 900  |
| aaggagcgct  | tcctc 915   |

<210> 68  
 <211> 2091  
 <212> DNA  
 <213> Streptococcus pneumoniae

|            |   |
|------------|---|
| <400> 68   |   |
| atgaataaaa | gaggctcttta ttcaaaacta ggaatttccg ttgtaggcat tagtctttta 60  |
| atgggagttc | ccactttgat tcatgcgaat gaattaaact atgggtcaact gtccatatct 120 |
| cctatctttc | aaggaggttc atatcaactg aacaataaga gtatagatat cagctctttg 180  |

## 1028462\_1.TXT

|   |      |
|---|------|
| ttattagata aattgtcttg agagagtcag acagtagtaa tgaaatttaa agcagataaa   | 240  |
| ccaaactctc ttcaagcttt gtttggccta tctaatagta aagcaggctt taaaaataat   | 300  |
| tacttttcaa ttttcatgag agattctggt gagataggtg tagaaataag agacgcccaa   | 360  |
| aagggaataa attattttatt ttccagacca gcttcattat ggggaaaaca taaaggacag  | 420  |
| gcagttgaaa atacactagt atttgtatct gattctaaag ataaaacata cacaatgtat   | 480  |
| gttaatggaa tagaagtgtt ctctgaaaca gttgatacat ttttgccaat ttcaaataa    | 540  |
| aatggtatag ataaggcaac actaggagct gttaatcgtg aaggtaagga acattacctc   | 600  |
| gcaaaaggaa gtattgatga aatcagtcata ttttaacaaag caattagtga tcaggaagtt | 660  |
| tcaactattc ccttgtcaaa tccatttcag ttaattttcc aatcaggaga ttctactcaa   | 720  |
| gctaactatt ttagaataacc gacactatat acattaagta gtggaagagt tctatcaagt  | 780  |
| attgatgcac gttatggttg gactcatgat tctaaaagta agattaatat tgccacttct   | 840  |
| tatagtgatg ataatgggaa aacgtggagt gagccaattt ttgctatgaa gtttaatgac   | 900  |
| tatgaggagc agttagttta ctggccacga gataataaat taaagaatag tcaaattagt   | 960  |
| ggaagtgctt cattcataga ttcatccatt gttgaagata aaaaatcttg gaaaacgata   | 1020 |
| ttactagctg atgttatgcc tgcgggtatt ggaaataata atgcaaataa agccgactca   | 1080 |
| ggttttaaag aaataaatgg tcattattat ttaaaactaa agaagaatgg agataacgat   | 1140 |
| ttccgttata cagttagaga aaatggtgtc gtttataatg aaacaactaa taaacctaca   | 1200 |
| aattatacta taaatgataa gtatgaagtt ttggagggag gaaagtcttt aacagtcgaa   | 1260 |
| caatattcgg ttgattttga tagtggtctt ttaagagaaa ggcataatgg aaaacagggt   | 1320 |
| cctatgaatg ttttctacaa agattcgtta tttaaagtga ctctactaa ttatatagca    | 1380 |
| atgacaacta gtcagaatag aggagagagt tgggaacaat ttaagttggt gcctccgttc   | 1440 |
| ttaggagaaa aacataatgg aacttactta tgtcccggac aagggttagc attaaaatca   | 1500 |
| agtaacagat tgatttttgc aacatatact agtgagaaac taacctatct cttttctgat   | 1560 |
| gatagtggtc aaacatggaa gaaatcctca gcttcaattc cgtttaaaaa tgcaacagca   | 1620 |
| gaagcacaaa tggttgaact gagagatggt gtgattagaa cattcttttag aaccactaca  | 1680 |
| ggtaagatag cttatatgac tagtagagat tctggagaaa catgggtcgaa agtttcgtat  | 1740 |
| attgatggaa tccaacaaac ttcatatggc acacaagtat ctgcaattaa atactctcaa   | 1800 |
| ttaattgatg gaaaagaagc agtcattttg agtacaccaa attctagaag tggccgcaag   | 1860 |
| ggaggccaat tagttgtcgg tttagtcaat aaagaagatg atagtattga ttggaaatac   | 1920 |
| cactatgata ttgatttgcc ttcgtatggt tatgcctatt ctgcgattac agaattgcca   | 1980 |
| aatcatcaca taggtgtact gtttgaaaaa tatgattcgt ggtcgagaaa tgaattgcat   | 2040 |
| ttaagcaatg tagttcagta tatagatttg gaaattaatg atttaacaaa a            | 2091 |

## 1028462\_1.TXT

<210> 69  
 <211> 2884  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 69  
 atgaatcgga gtgttcaaga acgtaagtgt cgttatagca ttaggaaact atcggtagga 60  
 gcggttttcta tgattgtagg agcagtggta tttggaacgt ctctgtttt agctcaagaa 120  
 ggggcaagtg agcaacctct ggcaaatagaa actcaacttt cgggggagag ctcaacccta 180  
 actgatacag aaaagagcca gccttcttca gagactgaac tttctggcaa taagcaagaa 240  
 caagaaagga aagataagca agaagaaaaa attccaagag attactatgc acgagatttg 300  
 gaaaatgtcg aaacagtgat agaaaaagaa gatgttgaaa ccaatgcttc aaatggtcag 360  
 agagttgatt tatcaagtga actagataaa ctaaagaaac ttgaaaacgc aacagttcac 420  
 atggagttta agccagatgc caaggcccca gcattctata atctcttttc tgtgtcaagt 480  
 gctactaaaa aagatgagta cttcactatg gcagtttaca ataatactgc tactctagag 540  
 gggcgtgggtt cggatgggaa acagttttac aataattaca acgatgcacc cttaaaagtt 600  
 aaaccaggtc agtggaattc tgtgactttc acagttgaaa aaccgacagc agaactacct 660  
 aaaggccgag tgcgcctcta cgtaaaccgg gtattatctc gaacaagtct gagatctggc 720  
 aatttcatta aagatatgcc agatgtaacg catgtgcaaa tcggagcaac caagcgtgcc 780  
 aacaatacgg tttgggggtc aaatctacag attcggaaac tcaactgtgt taatcgtgct 840  
 ttaacaccag aagaggtaca aaaacgtagt caacttttta aacgctcaga tttagaaaaa 900  
 aaactacctg aaggagcggc ttttaacagag aaaacggaca tattcgaaag cgggcgtaac 960  
 ggtaacccaa ataaagatgg aatcaagagt tatcgtattc cagcacttct caagacagat 1020  
 aaaggaactt tgatcgcagg tgcagatgaa cgccgtctcc attcgagtga ctggggtgat 1080  
 atcggtatgg tcatcagacg tagtgaagat aatggtaaaa cttgggggtga ccgagtaacc 1140  
 attaccaact tacgtgacaa tccaaaagct tctgacccat cgatcggttc accagtgaat 1200  
 atcgatatgg tgttggttca agatcctgaa accaaacgaa tcttttctat ctatgacatg 1260  
 ttcccagaag ggaagggaat ctttggaatg tcttcacaaa aagaagaagc ctacaaaaaa 1320  
 atcgatggaa aaacctatca aatcctctac cgtgaaggag aaaagggagc ttataaccatt 1380  
 cgagaaaatg gtactgtcta tacaccagat ggtaaggcga cagactatcg cgttgttgta 1440  
 gatcctgtta aaccagccta tagcgacaag ggtgatctat acaagggtga ccaattacta 1500  
 ggaaatatct acttcacaac aaacaaaact tctccattta gaattgccaa ggatagctat 1560  
 ctatggatgt cctacagtga tgacgacggg aagacatggt cagctcctca agatattact 1620  
 ccgatgggtca aagccgattg gatgaaattc ttgggtgtag gtcctggaac aggaattgta 1680

## 1028462\_1.TXT

|  |      |
|--|------|
| cttcggaatg ggcctcaciaa gggacggatt ttgataccgg tttatacgac taataatgta | 1740 |
| tctcacttag atggctcgca atcttctcgt gtcattctatt cagatgatca tggaaaaact | 1800 |
| tggcatgctg gagaagcggg caacgataac cgtcaggtag acgggtcaaaa gatccactct | 1860 |
| tctacgatga acaatagacg tgcgcaaaat acagaatcaa cgggtggtaca actaaacaat | 1920 |
| ggagatgtta aactctttat gcgtgggttg actggagatc ttcagggttg tacaagtaaa  | 1980 |
| gacggaggag tgacttgga gaaggatatt aaacgttatt cacagggtta agatgtctat   | 2040 |
| gttcaaatgt ctgctatcca tacgatgcac gaaggaaaag aatacatcat cctcagtaat  | 2100 |
| gcagggtggac cgaaacgtga aaatgggatg gtccacttgg cacgtgtcga agaaaatggg | 2160 |
| gagttgactt ggctcaaca caatccaatt caaaaaggag agtttgccta taattcgctc   | 2220 |
| caagaattag gaaatgggga gtatggcatc ttgtatgaac atactgaaaa aggacaaaat  | 2280 |
| gcctataccc tatcatttag aaaatttaaat tgggaatttt tgagcaaaaa tctgatttct | 2340 |
| cctaccgaag cgaactagag agatgggcaa aggagagatg ggcaaaggag ttattggctt  | 2400 |
| ggagttcgac tcagaagtat tggtaacaa ggctccaacc cttcaattgg caaatggtaa   | 2460 |
| aacagcgact ttcctaacc agtatgatag caagacctg ttgtttgcag tagataagga    | 2520 |
| agatatcgga caggaaatta ttggtatagc taaaggaagc atcgaaagta tgcataatct  | 2580 |
| tcctgtaa at ctagcaggtg ccagagttcc tggcggagta aatggtagca aagcagcgg  | 2640 |
| gcatgaagtt ccagaattta cagggggagt taatggtaca gagccagctg ttcattgaaat | 2700 |
| cgcagagtat aagggatctg attcgcttgt aactcttact acaaaaaaag attatactta  | 2760 |
| caaagctcct cttgctcagc aggcacttcc tgaaacagga aacaaggaga gtgacctcct  | 2820 |
| agcttcacta ggactaacag ctttcttctt tgggtctgtt acgctaggga aaaagagaga  | 2880 |
| acaa   | 2884 |

<210> 70  
 <211> 1977  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |     |
|--|-----|
| <400> 70   |     |
| atgatccaaa tcggcaagat ttttgccgga cgctatcgga ttgtcaaaca gattgggtcga | 60  |
| ggaggtatgg cggatgtcta cctagccaaa gacttaatct tagatgggga agaagtggca  | 120 |
| gtgaagggtt tgaggaccaa ctaccagacg gacccgatag ctgtagctcg ttttcagcgt  | 180 |
| gaagcgagag ctatggcaga tctagaccat cctcatatcg ttcggataac agatattggc  | 240 |
| gaggaagacg gtcaacagta cctagctatg gagtatgtgg ctggactgga cctcaaacgc  | 300 |
| tatatcaagg aacattatcc tcttttctaat gaagaagcag tccgtatcat gggacaaatt | 360 |
| ctcttggcta tgcgcttggc ccatactcga ggaattgttc acagggactt gaaacctcaa  | 420 |



## 1028462\_1.TXT

|             |             |            |             |            |            |      |
|-------------|-------------|------------|-------------|------------|------------|------|
| aatatcctct  | tgacaccaga  | tgggactgcc | aaggtcacag  | actttgggat | tgctgtagcc | 480  |
| tttgcagaga  | caagtctgac  | ccagactaac | tcgatgttgg  | gctcagttca | ttacttgtca | 540  |
| ccagagcagg  | cgcggtggtc  | gaaggcgact | gtgcagagtg  | atatctatgc | catggggatt | 600  |
| atcttctatg  | agatgctgac  | aggccatata | ccttatgacg  | gggatagcgc | ggtgaccatt | 660  |
| gccctccagc  | atttccagaa  | acccttgccg | tccgttattg  | cagaaaatcc | atctgtacct | 720  |
| caggcttttag | aaaatgttat  | tatcaaggca | actgctaaaa  | agttgaccaa | tcgctaccgc | 780  |
| tcggtttcag  | agatgtatgt  | ggacttgtct | agtagcttgt  | cctacaatcg | tagaaatgaa | 840  |
| agtaagttaa  | tctttgatga  | aacgagcaag | gcagatacca  | agaccttgcc | gaaggtttct | 900  |
| cagagtacct  | tgacatctat  | tcctaagggt | caagcgcaaa  | cagaacacaa | atcaatcaaa | 960  |
| aaccaagcc   | aggctgtgac  | agaggaaact | taccaaccac  | aagcaccgaa | aaaacataga | 1020 |
| tttaagatgc  | gttacctgat  | tttgttggcc | agccttgtat  | tggtggcagc | ttctcttatt | 1080 |
| tggatactat  | ccagaactcc  | tgcaaccatt | gccattccag  | atgtggcagg | tcagacagtt | 1140 |
| gcagaggcca  | aggcaacgct  | caaaaaagcc | aattttgaga  | ttggtgagga | gaagacagag | 1200 |
| gctagtgaag  | aggtggaaga  | agggcggatt | atccgtacag  | atcctggcgc | tggaactggt | 1260 |
| cgaaaagaag  | gaacgaaaat  | caattttggt | gtctcatcag  | gcaagcaatc | tttccaaatt | 1320 |
| agtaattatg  | tcggtcggaa  | atcctctgat | gtcattgcgg  | aattaaaaga | gaaaaaagtt | 1380 |
| ccagataatt  | tgattaaaaat | tgaggaagaa | gagtcgaatg  | agagtgaggc | tggaacggtc | 1440 |
| ctgaagcaaa  | gtctaccaga  | aggtacgacc | tatgacttga  | gcaaggcaac | tcaaattggt | 1500 |
| ttgacagtag  | ctaaaaaagc  | tacgacgatt | caattaggga  | actatattgg | acggaactct | 1560 |
| acagaagtaa  | tctcagaact  | caagcagaag | aagggttcctg | agaatttgat | taagatagag | 1620 |
| gaagaagagt  | ccagcgaaag  | cgaaccagga | acgattatga  | aacaaagtcc | aggtgccgga | 1680 |
| acgacttatg  | atgtgagtaa  | acctactcaa | attgtcttga  | cagtagctaa | aaaagttaca | 1740 |
| agtgttgcca  | tgccgagtta  | cattggttct | agcttggagt  | ttactaagaa | caatttgatt | 1800 |
| caaattgttg  | ggattaagga  | agctaataa  | gaagttgtag  | aagtgacgac | agcgcttgca | 1860 |
| ggtagtgcag  | aaggcatggt  | tgttgaacaa | agtcctagag  | cagggtgaaa | ggtagacctc | 1920 |
| aataagacta  | gagtcaagat  | ttcaatctac | aaacctaata  | caacttcagc | tactcct    | 1977 |

&lt;210&gt; 71

&lt;211&gt; 933

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 71

|            |            |             |            |             |            |     |
|------------|------------|-------------|------------|-------------|------------|-----|
| atgacaaaac | taatctttat | ggggaccccc  | gacttttcag | caacagtcctt | aaaaggactt | 60  |
| ttgacagatg | accgttacga | aattcttagcc | gttgtgaccc | agccagaccg  | tgctgttggt | 120 |

## 1028462\_1.TXT

```

cgtaaaaaag ttatccaaga aaccccagtc aagcaggctg ccaaggaagc aggactatct 180
atctaccaac ctgaaaaatt atctggaagt ccagagatgg aagatcttat gaagctagga 240
gcagatggaa ttgtgactgc tgcttttggg cagtttctcc caagcaaact ccttgatagc 300
atggactttg ctgtcaacgt tcatgcctcc ctccttccta gacaccgtgg tgggtgcgcct 360
atccattatg ccttgattca aggggatgag gaagctggtg tgaccatcat ggaaatggtt 420
aaggaaatgg atgcaggaga tatgatttct cgctgcagca ttccgatcac agatgaggac 480
aatgttggca ccttgtttga aaaattggcg ctagttggtc gtgatttgct tttggacact 540
ctgcctgcct atattgctgg tgatatcaaa cctgaaccgc aggatacgag tcaggttacc 600
ttctctccaa atataaagcc agaggaagaa aaactggact ggaacaaaac caatcgtcaa 660
ctctttaacc aaattcgtgg aatgaacccc tggcctggtg ccatacttt ccttaagggc 720
gaccgcttta agatttatga agccctacca gtagaaggtc agggaaatcc aggtgagatt 780
ctctctatcg gcaagaaaga attgattgtc gcaacggctg aaggggctct atccctcaaa 840
caagtgcagc cagctggtaa gcctaagatg gacattgctt ccttcctcaa cggagttgga 900
cgtacattga ctgtaggaga acgatttggg gac 933

```

&lt;210&gt; 72

&lt;211&gt; 2370

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 72

```

gtgttttagac gtttaggtca agatttccag cttaggaaag tgaaaaagat tttaaagcag 60
attaatgccc tgaaaggcaa gatgtcctct ctttcggatc aagaattagt agctaaaaca 120
gtagagtttc gtcagcgtct ttccgagggg gaaagtctag acgatatttt ggttgaagct 180
tttgctgtgg tgcgtgaagc agataagcgg attttagggg tgtttcctta tgatgttcaa 240
gtcatgggag ctattgtcat gcactatgga aatgttgctg agatgaatac gggggaaggt 300
aagaccttga cagctaccat gcctgtctat ttgaacgctt tttcaggaga aggagtgatg 360
gttgtgactc ctaatgagta tttatcaaag cgtgatgccg aggaaatggg tcaagtttat 420
cgttttctag gattgaccat tgggtgtacca tttacggaag atccaaagaa ggagatgaaa 480
gctgaagaaa agaagcttat ctatgcttcg gatatcatct acacaaccaa tagtaattta 540
ggttttgatt atctaaatga taacctagcc tcgaatgaag aaggtaagtt tttacgaccg 600
tttaactatg tgattattga tgaaattgat gatatcttgc ttgatagtgc acaaactcct 660
ctgattattg cgggttctcc tcgtgttcag tctaattact atgcgatcat tgatacactt 720
gtaacaacct tggtcgaagg agaggattat atctttaaag aggagaaaga ggaggtttgg 780
ctcactacta agggggccaa gtctgctgag aatttcctag ggattgataa tttatacaag 840

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1028462\_1.TXT

|            |            |            |             |            |            |      |
|------------|------------|------------|-------------|------------|------------|------|
| gaagagcatg | cgtcttttgc | tcgtcatttg | gtttatgcga  | ttcgagctca | taagctcttt | 900  |
| actaaagata | aggactatat | cattcgtgga | aatgagatgg  | tactggttga | taagggaaca | 960  |
| gggcgtctaa | tggaatgac  | taaacttcaa | ggaggtctcc  | atcaggctat | tgaagccaag | 1020 |
| gaacatgtca | aattatctcc | tgagacgcgg | gctatggcct  | cgatcaccta | tcagagtctt | 1080 |
| tttaagatgt | ttaataagat | atctggtatg | acagggacag  | gtaaggctgc | ggaaaaagag | 1140 |
| tttattgaaa | cttacaatat | gtctgtagta | cgcattccaa  | ccaatcgtcc | gagacaacgg | 1200 |
| attgactatc | cagataatct | atatatcact | ttacctgaaa  | aagtgtatgc | atccttggag | 1260 |
| tacatcaagc | aataccatgc | taagggaat  | cctttactcg  | ttttttagtg | ctcagttgaa | 1320 |
| atgtctcaac | tctattcgtc | tctcttgttt | cgtgaaggga  | ttgcccataa | tgtcctaaat | 1380 |
| gctaataatg | cggcgcgtga | ggctcagatt | atctccgagt  | caggtcagat | gggggctgtg | 1440 |
| acagtggcta | cctctatggc | aggacgtggt | acggatatca  | agcttggtaa | aggagtcgca | 1500 |
| gagcttgggg | gcttgattgt | tattgggact | gagcggatgg  | aaagtcagcg | gatcgacct  | 1560 |
| caaattcgtg | gccgttctgg | tcgtcaggg  | gatcctggta  | tgagtaaatt | ttttgtatcc | 1620 |
| ttagaggatg | atgttatcaa | gaaatttggt | ccatcttggg  | tgcataaaaa | gtacaaagac | 1680 |
| tatcaggttc | aagatatgac | tcaaccggaa | gtattgaaag  | gtcgtaaata | ccggaaacta | 1740 |
| gtcgaagagg | ctcagcatgc | cagtgatagt | gctggacgtt  | cagcacgtcg | tcagactctg | 1800 |
| gagtatgctg | aaagtatgaa | tatacaacgg | gatatagtct  | ataaagagag | aaatcgtcta | 1860 |
| atagatgggt | ctcgtgactt | agaggatggt | gttggtggata | tcattgagag | atatacagaa | 1920 |
| gaggtagcgg | ctgatcacta | tgctagtcgt | gaattattgt  | ttcactttat | tgtgaccaat | 1980 |
| attagttttc | atgttaaaga | ggttccagat | tatatagatg  | taactgacaa | aactgcagtt | 2040 |
| cgtagcttta | tgaagcaggt | gattgataaa | gaactttctg  | aaaagaaaga | attacttaat | 2100 |
| caacatgact | tatatgaaca | gtttttacga | ctttcactgc  | ttaaagccat | tgatgacaac | 2160 |
| tggttagagc | aggtagacta | tctacaacag | ctatccatgg  | ctatcggtgg | tcaatctgct | 2220 |
| agtcagaaaa | atccaatcgt | agagtactat | caagaagcct  | acgcgggctt | tgaagctatg | 2280 |
| aaagaacaga | ttcatgcgga | tatggtgcgt | aatctcctga  | tggggctggt | tgaggtcact | 2340 |
| ccaaaaggtg | aaatcgtgac | tcattttcca |             |            |            | 2370 |

<210> 73  
 <211> 14328  
 <212> DNA  
 <213> Streptococcus pneumoniae

|            |   |
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| <400> 73   |   |
| atgaccgaaa | cggtagaaga taaagtaagt cattcaatta ctgggcttga taccctcaag 60   |
| gggatagttg | ctgcgggagc tgtcataagt ggaaccgttg caactcaaac gaaggatattt 120 |

## 1028462\_1.TXT

|            |            |            |            |             |            |      |
|------------|------------|------------|------------|-------------|------------|------|
| acaaatgagt | cagcagtact | tgaaaaaact | gtagagaaaa | cggatgcttt  | ggcaacaaat | 180  |
| gatacagtag | ttctaggtac | gatatctaca | agtaattcag | cgagttcaac  | tagtttgtca | 240  |
| gcttcagagt | cggcaagtac | atctgcatct | gagtcagcct | caaccagcgc  | ttcgacctca | 300  |
| gcaagtacaa | gtgcatcaga | atcagcaagt | acatcggtct | cgacaagtat  | ttctgcatca | 360  |
| tctactgtgg | taggttcaca | aacagctgcc | gctacagaag | caactgctaa  | gaaggctgaa | 420  |
| gaagatcgta | agaaaccagc | tagtgattat | gtagcatcag | ttacaaatgt  | caatctccaa | 480  |
| tcttatgcta | agcgacgcaa | gcgttcagtg | gattccatcg | agcaattgct  | ggcttctata | 540  |
| aaaaatgctg | ctgttttttc | tggcaatacg | attgtaaatg | gcgcccctgc  | aattaatgca | 600  |
| agtctaaaca | ttgctaaaag | tgagacaaaa | gtttatacag | gtgaagggtgt | agattcggta | 660  |
| tatcgtgttc | caatttacta | taaattgaaa | gtgacaaatg | atggttcaaa  | attgaccttt | 720  |
| acctatacgg | ttacgtatgt | gaatcctaaa | acaaatgata | ttggtaatat  | atcaagtatg | 780  |
| cgctctggat | attctatcta | taattcaggt | acttcaacac | aaacaatgtt  | aacccttggc | 840  |
| agtgatcttg | gtaaaccttc | aggtgtaaag | aactacatta | ctgacaaaaa  | tggtagacag | 900  |
| gttctatcct | ataatacatc | tacaatgacg | acgcagggtg | gtgggtatac  | ttggggaaat | 960  |
| ggtgccccaa | tgaatggttt | ctttgctaag | aaaggatatg | gattaacatc  | atcttggact | 1020 |
| gtaccaatta | ctggaacgga | tacatccttt | acatttacc  | cttacgctgc  | tagaacagat | 1080 |
| agaattggaa | ttactactt  | caatggtgga | ggaaaggtag | ttgaatctag  | cacgaccagt | 1140 |
| cagtcacttt | cacagtctaa | gtcactctca | gtaagtgtca | gtcaaagcgc  | ctcagcttca | 1200 |
| gcatcaacaa | gtgcgtcggc | ttcagcatca | accagtgctt | cggcttcagc  | gtcaaccagt | 1260 |
| gcgtcagctt | cagcaagtac | cagtgtctca | gtctcagcat | caacaagtgc  | ttcagcctca | 1320 |
| gcatcgacaa | gtgcctcggc | ttcagcaagc | acatcagcat | ctgaatcagc  | gtcaaccagt | 1380 |
| gcttcggctt | cagcaagtac | cagtgtctca | gcttcagcat | caaccagcgc  | ctcggcctca | 1440 |
| gcaagcacct | cagcttctga | atcggcctca | accagcgcct | cggcctcagc  | aagcacctca | 1500 |
| gcttctgaat | cggcctcaac | cagcgcctca | gcctcagcat | caacgagtgc  | ttcggcttca | 1560 |
| gcaagcacia | gcgcctcggg | ttcagcatca | acgagtacgt | cagcttcagc  | gtcaaccagt | 1620 |
| gcttcagcct | cagcatcaac | aagtgcgtca | gcctcagcaa | gtatctcagc  | gtctgaatcg | 1680 |
| gcatcaacga | gtgcgtctga | gtcagcatca | acgagtacgt | cagcctcagc  | aagcacctca | 1740 |
| gcttctgaat | cggcctcaac | cagtgcgtca | gcctcagcat | cgacaagcgc  | ctcagcttca | 1800 |
| gcaagtacca | gtgcttcagc | ctcagcgtcg | acaagtgcgt | cggcctcaac  | cagtgcattt | 1860 |
| gaatcggcat | caaccagtgc | gtcagcctca | gcaagtacta | gtgcatcggc  | ttcagcatca | 1920 |
| accagtgctt | cggcttcagc | gtcaaccagt | gcgtcagctt | cagcaagtac  | cagtgtctca | 1980 |

## 1028462\_1.TXT

|            |            |            |            |            |            |      |
|------------|------------|------------|------------|------------|------------|------|
| gtctcagcat | caacaagtgc | ttcagcctca | gcatcgacaa | gtgcctcggc | ttcagcaagc | 2040 |
| acatcagcat | ctgaatcagc | gtcgacaagc | gcctcagctt | cagcaagtac | cagtgcgtca | 2100 |
| gcctcagcgt | cgacaagtgc | gtcagcctca | gcaagtacta | gtgcatcagc | ttcagcatca | 2160 |
| acgagtgc   | cggcttcggc | gtcaaccagt | gcatcagagt | cagcaagtac | cagtgcgtca | 2220 |
| gcttcgc    | caacaagtgc | ctcggcttca | gcaagcacca | gtgcgtcggc | ttcagcaagt | 2280 |
| actagcgct  | cagcctcagc | ctcaaccagt | gcgtcagcct | cagcaagtat | ctcagcgtct | 2340 |
| gaatcggcat | caacgagtgc | gtccgcttca | gcaagtacta | gcgcctcagc | ctcagcgtca | 2400 |
| acaagtgc   | cggcttcagc | gtcaacgagt | gcgtctgaat | cggcatcaac | gagtgcgtcc | 2460 |
| gcttcagcaa | gtactagcgc | ctcagcctca | gcgtcaacaa | gtgcatcggc | ttcagcatca | 2520 |
| acgagtgcgt | ccgcttcagc | aagtactagc | gcctcagcct | cagcgtcaac | aagtgc     | 2580 |
| gcttcagcgt | caacgagtgc | gtctgagtca | gcatcaacga | gtgcgtcagc | ctcagcaagc | 2640 |
| acatcagctt | ctgaatctgc | atcaaccagt | gcgtcagcct | cagcatcgac | aagcgcctca | 2700 |
| gcttcagcaa | gtaccagtgc | gtcagcctca | gcgtcgacaa | gtgcgtcggc | ttcagcaagt | 2760 |
| accagtgcgt | cagcctcagc | aagtaccagt | gcgtcagcct | cagcgtcgac | aagtgcgtcg | 2820 |
| gcctcaacca | gtgcatctga | atcggcatca | accagtgcgt | cagcctcagc | aagtactagt | 2880 |
| gcatcagctt | cagcatcaac | gagtgc     | gcttcagcat | caaccagtgc | atcagagtca | 2940 |
| gcaagtacca | gtgcgtcagc | ttccgcatca | acaagtgcct | cggcttcagc | aagtactagc | 3000 |
| gcctcagcct | cagcgtcaac | aagtgc     | gcttcgcgt  | caaccagcgc | ctcggcctca | 3060 |
| gcaagtatct | cagcgtctga | atcggcatca | acaagtgcct | cggcttcagc | atcaacgagt | 3120 |
| gcatcagctt | cagcaagcac | cagtgcgtcg | gcctcagcaa | gcaccagcgc | gtctgaatcc | 3180 |
| gcatcaacca | gtgcctcagc | ttcagcaagt | acctcagcat | ctgaatcagc | atcaacaagt | 3240 |
| gcctcggctt | cagcaagcac | aagtgc     | gcctcagcaa | gtatctcagc | gtctgaatcg | 3300 |
| gcatcaacga | gtgcgtccgc | ttcagcaagt | actagcgct  | cagcatcagc | gtcaacaagt | 3360 |
| gcttcggctt | cagcgtcaac | gagtgcgtct | gagtcagcat | caacgagtac | gtcagcctca | 3420 |
| gcaagcacat | cagcttctga | atctgcatca | accagtgcgt | cagcctcagc | atcgacaagc | 3480 |
| gcctcagctt | cagcaagtac | cagtgcgtca | gcctcagcaa | gtaccagtgc | ttcagcctca | 3540 |
| gcgtcgacaa | gtgcgtcggc | ctcaaccagt | gcatctgaat | cggcatcaac | cagtgcgtca | 3600 |
| gcctcagcaa | gtactagcgc | ctcagcctca | gcatcaacga | gtgcgtccgc | ttcagcaagt | 3660 |
| actagtgc   | cagcttcagc | aagtactagc | gcctcagcct | cagcgtcgac | aagcgcctca | 3720 |
| gcttcagcaa | gtaccagtgc | gtcagcctca | gcgtcgacaa | gtgcgtcggc | ttcagcaagt | 3780 |
| acctcagcgt | ctgaatcagc | atcaacaagt | gcgtcggctt | cagcatcaac | gagtgc     | 3840 |
| gcttcagcat | caacaagtgc | ttcagcttca | gcaagtacca | gtgcgtcggc | ttcagcatca | 3900 |

## 1028462\_1.TXT

|            |            |            |            |            |             |      |
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| gcttcagcaa | gcaccagtgc | ttcggcttca | gcgtcaacga | gtgcgctga  | gtcagcatca  | 4020 |
| acgagtgcg  | cagcctcagc | aagcacatca | gcttctgaat | ctgcatcaac | cagtgcgta   | 4080 |
| gcttccgcat | caacaagcgc | ctcggcctca | gcaagtacaa | gtgcttcagc | ctcagcatca  | 4140 |
| accagtgc   | cagcttcagc | ctcaacaagt | gcttcagcct | cagcgtaac  | cagtgccctcg | 4200 |
| gcttcagcaa | gtaccagtgc | gtcagcttca | gcaagcacia | gtgcgtaagc | ttcagcatca  | 4260 |
| accagtgc   | cggcttcggc | atcaacaagt | gcctcagcat | cagcatcaac | gagtgcgta   | 4320 |
| gcctcagcaa | gtactagtgc | atcagcatca | gcatcaacca | gtgcatcagc | ctcagcaagt  | 4380 |
| atctcagcgt | ctgaatcggc | atcaacgagt | gcatcagcat | cagcatcaac | gagtgcatcg  | 4440 |
| gcttcagcgt | caaccagtgc | atcagcttca | gcaagcacc  | gtgcgtcggc | ttcagcatca  | 4500 |
| acgagtgcc  | cagcctcagc | aagtatctca | gcgtctgaat | cggcatcaac | gagtgcgta   | 4560 |
| gcctcagcaa | gtactagtgc | atcggcttca | gcaagcacc  | gtgcgtcggc | ttcagcatca  | 4620 |
| accagtgc   | cagcctcagc | aagtatctca | gcgtctgaat | cggcatcaac | gagtgcgta   | 4680 |
| gcctcagcaa | gtactagtgc | atcagcatca | gcatcaacga | gtgcatcggc | ttcagcaagt  | 4740 |
| accagcgcc  | cagcttcagc | aagcaccagt | gcgtcagcct | cagcaagtac | cagcgccctca | 4800 |
| gcctcagcaa | gcaccagtgc | ctcagcttca | gcaagtacca | gtgcgtaagc | ctcagcgctcg | 4860 |
| acaagtgcg  | cggcttcagc | aagtacctca | gcgtctgaat | cagcatcaac | gagtgcatca  | 4920 |
| gcttcagcat | caacaagtgc | ttcagcttca | gcaagtacca | gtgcgtcggc | ttcagcatca  | 4980 |
| acgagtgctt | cagtctcagc | gtcaaccagt | gcctctgaat | cagcatcaac | aagtgccctcg | 5040 |
| gcttcagcaa | gcaccagtgc | gtcggcttca | gcaagtacta | gtgcatcggc | ttcagcatcg  | 5100 |
| acaagtgcg  | ctgaatcggc | atcaacgagt | gcttcggctt | cagcatcaac | gagtgcgta   | 5160 |
| gcctcagcaa | gcacatcagc | ttctgaatct | gcatcaacca | gtgcgtcgc  | ttcagcgta   | 5220 |
| accagtgc   | cggcttcagc | gtcgacaagt | gcttcggctt | cagcatcaac | gagtgcgta   | 5280 |
| gcctcagcaa | gcgcaagtac | ctcagcgta  | gcttccgcct | caaccagtgc | gtcggcttca  | 5340 |
| gcaagcacia | gtgcgtaagc | ctcagcaagt | atctcagcgt | ctgaatcggc | atcaacgagt  | 5400 |
| gcgtctgagt | cagcatcaac | gagtagtca  | gcctcagcaa | gcacatcagc | ttctgaatct  | 5460 |
| gcatcaacca | gtgcgtaagc | ctcagcatcg | acaagcgcc  | cagcttcagc | aagtaccagt  | 5520 |
| gcttcagcct | cagcgtaagc | aagtgcgta  | gcctcaacca | gtgcatctga | atcggcatca  | 5580 |
| accagtgc   | cagcctcagc | aagtactagt | gcatcagctt | cagcatcaac | gagtgcatcg  | 5640 |
| gcttcagcat | caaccagtgc | ctcggcttca | gcgtcaacca | gtgcgtaagc | ttcagcaagt  | 5700 |
| accagtgc   | cagtctcagc | atcaacaagt | gcttcagcct | cagcatcgac | aagtgccctcg | 5760 |

## 1028462\_1.TXT

|            |             |            |            |             |            |      |
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| accagtgcgt | cagcctcagc  | gtcgacaagt | gcgtcagcct | cagcaagtac  | tagtgcatca | 5880 |
| gcttcagcat | caacgagtgc  | atcggcttcg | gcgtcaacca | gtgcatcaga  | gtcagcaagt | 5940 |
| accagtgcgt | cagcttccgc  | atcaacaagt | gcctcggctt | cagcaagcac  | cagtgcgtcg | 6000 |
| gcttcagcaa | gtactagcgc  | ctcagcctca | gcctcaacca | gtgcgtcagc  | ctcagcaagt | 6060 |
| atctcagcgt | ctgaatcggc  | atcaacgagt | gcgtccgctt | cagcaagtac  | tagcgcctca | 6120 |
| gcctcagcgt | caacaagtgc  | atcggcttca | gcgtcaacga | gtgcgtctga  | atcggcatca | 6180 |
| acgagtgcgt | ccgcttcagc  | aagtactagc | gcctcagcct | cagcgtcaac  | aagtgcacgc | 6240 |
| gcttcagcat | caacgagtgc  | gtccgcttca | gcaagtacta | gcgccctcagc | ctcagcgtca | 6300 |
| acaagtgcac | cggcttcagc  | gtcaacgagt | gcgtctgagt | cagcatcaac  | gagtgcgtca | 6360 |
| gcctcagcaa | gcacatcagc  | ttctgaatct | gcatcaacca | gtgcgtcagc  | ctcagcatcg | 6420 |
| acaagcgcct | cagcttcagc  | aagtaccagt | gcgtcagcct | cagcgtcgac  | aagtgcgtcg | 6480 |
| gcttcagcaa | gtaccagtgc  | gtcagcctca | gcaagtacca | gtgcgtcagc  | ctcagcgtcg | 6540 |
| acaagtgcgt | cggcctcaac  | cagtgcacat | gaatcggcat | caaccagtgc  | gtcagcctca | 6600 |
| gcaagtacta | gtgcatcagc  | ttcagcatca | acgagtgcac | cggcttcagc  | atcaaccagt | 6660 |
| gcatcagagt | cagcaagtac  | cagtgcgtca | gcttccgcat | caacaagtgc  | ctcggcttca | 6720 |
| gcaagtacta | gcgccctcagc | ctcagcgtca | acaagtgcct | cagcttccgc  | gtcaaccagc | 6780 |
| gcctcggcct | cagcaagtac  | ctcagcgtct | gaatcggcat | caacaagtgc  | ctcggcttca | 6840 |
| gcatcaacga | gtgcatcagt  | ctcagcaagc | accagtgcgt | cggcctcagc  | aagcaccagc | 6900 |
| gcgtctgaat | ccgcatcaac  | cagtgcctca | gcttcagcaa | gtacctcagc  | atctgaatca | 6960 |
| gcatcaacaa | gtgcatcggc  | ttcagcaagc | acaagtgcct | cagcctcagc  | aagtatctca | 7020 |
| gcgtctgaat | cggcatcaac  | gagtgcgtcc | gcttcagcaa | gtactagcgc  | ctcagcatca | 7080 |
| gcgtcaacaa | gtgcttcggc  | ttcagcgtca | acgagtgcgt | ctgagtcagc  | atcaacgagt | 7140 |
| acgtcagcct | cagcaagcac  | atcagcttct | gaatctgcat | caaccagtgc  | gtcagcctca | 7200 |
| gcatcgacaa | gcgccctcagc | ttcagcaagt | accagtgcgt | cagcctcagc  | aagtaccagt | 7260 |
| gcttcagcct | cagcgtcgac  | aagtgcgtcg | gcctcaacca | gtgcatctga  | atcggcatca | 7320 |
| accagtgcgt | cagcctcagc  | aagtactagc | gcctcagcct | cagcatcaac  | gagtgcgtcc | 7380 |
| gcttcagcaa | gtactagtgc  | atcagcatca | gcatcaacga | gtgcatcggc  | ttcagcaagt | 7440 |
| accagcgcct | cagcttcagc  | aagcaccagt | gcgtcagcct | cagcaagtac  | cagcgcctca | 7500 |
| gcctcagcaa | gcaccagtgc  | ctcagcttca | gcaagtacca | gtgcgtcagc  | ctcagcgtcg | 7560 |
| acaagtgcgt | cggcttcagc  | aagtacctca | gcgtctgaat | cagcatcaac  | gagtgcacat | 7620 |
| gcttcagcat | caacaagtgc  | ttcagcttca | gcaagtacca | gtgcgtcggc  | ttcagcatca | 7680 |

## 1028462\_1.TXT

|            |            |            |            |            |            |      |
|------------|------------|------------|------------|------------|------------|------|
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| gcttcagcaa | gcaccagtgc | gtcggcttca | gcaagtacta | gtgcatcggc | ttcagcatcg | 7800 |
| acaagtgcgt | ctgaatcggc | atcaacgagt | gcttcggctt | cagcatcaac | gagtgcgtca | 7860 |
| gcctcagcaa | gcacatcagc | ttctgaatct | gcatcaacca | gtgcgtccgc | ttcagcgtca | 7920 |
| accagtgcgt | cggcttcagc | gtcgacaagt | gcttcggctt | cagcatcaac | gagtgcgtcg | 7980 |
| gcctcagcaa | gcgcaagtac | ctcagcgtca | gcttcgcgct | caaccagtgc | gtccgcttca | 8040 |
| gcaagcacia | gtgcgtcagc | ctcagcaagt | atctcagcgt | ctgaatcggc | atcaacgagt | 8100 |
| gcgtcggcct | cagcaagcgc | aagtacctca | gcgtcagctt | ccgcctcaac | cagtgcgtcg | 8160 |
| gcttcagcaa | gcacaagtgc | gtcagcctca | gcaagtatct | cagcgtctga | atcggcatca | 8220 |
| acgagtgctt | ctgagtcagc | atcaacgagt | acgtcagcct | cagcaagcac | atcagcttct | 8280 |
| gaatcggcat | caaccagtgc | gtcagcctca | gcatcgacaa | gcgcctcagc | ttcagcaagt | 8340 |
| accagtgcct | cagcctcagc | gtcgacaagt | gcgtcggcct | caaccagtgc | atctgaatcg | 8400 |
| gcatcaacca | gtgcgtcagc | ctcagcaagt | actagtgcct | cagcttcagc | atcaacgagt | 8460 |
| gcatcggctt | cagcatcaac | cagtgcctcg | gcttcagcgt | caaccagtgc | gtcagcttca | 8520 |
| gcaagtacca | gtgcttcagt | ctcagcatca | acaagtgcct | cagcctcagc | atcgacaagt | 8580 |
| gcctcggctt | cagcaagcac | atcagcatct | gaatcagcgt | cgacaagtgc | gtcggcctca | 8640 |
| accagtgcct | ctgaatcggc | atcaaccagt | gcgtcagcct | cagcaagtac | tagtgcctca | 8700 |
| gcttcagcat | caacgagtgc | atcggcttct | gcgtcaacca | gtgcatcaga | gtcagcaagt | 8760 |
| accagtgcgt | cagcttcgcg | atcaacaagt | gcctcggctt | cagcaagcac | atcagcatct | 8820 |
| gaatcagcgt | caaccagtgc | ttcggcttca | gcaagtacca | gtgcttcagc | ttcagcatca | 8880 |
| accagcgcct | cggcctcagc | aagcacctca | gcttctgaat | cggcctcaac | cagcgcctcg | 8940 |
| gcctcagcaa | gcacctcagc | ttctgaatcg | gcctcaacca | gcgcctcagc | ctcagcatca | 9000 |
| acgagtgctt | cggcttcagc | aagcacaagc | gcctcggggt | cagcatcaac | gagtacgtca | 9060 |
| gcttcagcgt | caaccagtgc | ttcagcctca | gcatcaacca | gtgcgtcagc | ctcagcaagt | 9120 |
| atctcagcgt | ctgaatcggc | atcaacgagt | gcgtctgagt | cagcatcaac | gagtacgtca | 9180 |
| gcctcagcaa | gcacctcagc | ttctgaatcg | gcctcaacca | gtgcgtcagc | ctcagcatcg | 9240 |
| acaagcgcct | cagcttcagc | aagtaccagt | gcttcagcct | cagcgtcgac | aagtgcgtcg | 9300 |
| gcctcaacca | gtgcatctga | atcggcatca | accagtgcgt | cagcctcagc | aagtactagt | 9360 |
| gcatcggctt | cagcatcaac | cagtgcctcg | gcttcagcgt | caaccagtgc | gtcagcttca | 9420 |
| gcaagtacca | gtgcttcagt | ctcagcatca | acaagtgcct | cagcctcagc | atcgacaagt | 9480 |
| gcctcggctt | cagcaagcac | atcagcatct | gaatcagcgt | cgacaagcgc | ctcagcttca | 9540 |



## 1028462\_1.TXT

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gcatcagctt cagcatcaac gagtgcctcg gcttcggcgt caaccagtgc atcagagtca 9660  
gcaagtacca gtgcgtcagc ttccgcatca acaagtgctt cggcttcagc aagcaccagt 9720  
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gcaagtatct cagcgtctga atcggcatca acgagtgctg ccgcttcagc aagtactagc 9840  
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## 1028462\_1.TXT

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## 1028462\_1.TXT

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<400> 75  
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 cgtgacaaag tattgacagc cattcgcggc gtttcccttg aactagtcga aggagaagta 120  
 ttagccttgg taggtgagtc aggatcaggt aaatctgttt tgacaaagac cttcacaggt 180  
 atgctcgaag aaaatggtcg tattgcccga ggtagtattg actaccgtgg tcaggacttg 240  
 acagctttat cttctcaca ggaattggga caaatcgtg gtgctaagat tgcgactatc 300  
 ttccaggacc caatgactag tttggacccc attaaaacaa ttggtagtca gattacagaa 360  
 gttattgtaa aacaccaagg aaaaacagct aaagaagcga aagaattggc cattgactac 420  
 atgaataagg ttggcattcc agacgcagat agacgtttta atgaataccc attccaatat 480  
 tctggaggaa tgcgtcaacg tatcgttatt gctattgccc ttgcctgccg acctgatgtc 540  
 ttgatctgtg atgagccaac aactgccttg gatgtaacta ttcaagctca gattattgat 600  
 ttgctaaaat ctttacaaaa cgagtatcat ttcacaacaa tctttattac ccacgacctt 660  
 ggtgtggtgg caagtattgc ggataaggta gcggttatgt atgcaggaga aatcgttgag 720  
 tatggaacgg ttgaggaagt cttctatgac cctcgccatc catatacatg gagtctcttg 780  
 tctagcttgc ctcagcttgc tgatgataaa ggggatcttt actcaatccc aggaacacct 840  
 ccgtcacttt atactgacct gaaaggggat gcttttgcct tgcgttctga ctacgcaatg 900  
 cagattgact tcgaacaaaa agctcctcaa ttctcagtat cagagacaca ttgggctaaa 960  
 acttggtctt ttcattgagga tgctccgaaa gtagaaaaac cagctgtgat tgcaaattct 1020  
 catgataaga tccgtgaaaa aatgggattt gcccatctgg ctgac 1065

<210> 76  
 <211> 1977  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 76  
 atgaaaaaaa atcgtgtatt tgctacagca ggtcttgttt tattagcagc aggtgtactt 60  
 gcagcatgca gttcttcaaa atcatctgat tcatcagccc ctaaagctta tggctatggt 120  
 tatacagcag acccagaaac cttggactac ctgatttcaa gtaaaaatag tacaacagta 180  
 gtgacttcaa atgggattga tggtttattc actaacgata attacggtaa tcttgctcct 240  
 gcagttgcag aggattggga agtctcctaag gatggtttga cctacactta taagattcgt 300  
 aaaggggtta aatggtttac ctctgatgga gaagaatatg cagagggtgac ggctaaagat 360  
 ttcgtgaacg gtttaaaaca cgcagcagat aaaaaatcag aagctatgta tttagctgaa 420

1028462\_1.TXT

|            |            |             |             |            |             |      |
|------------|------------|-------------|-------------|------------|-------------|------|
| aattcggtta | aaggcttggc | agattatcta  | tcaggaactt  | caacagattt | ttcaacagtt  | 480  |
| ggtgtcaagg | cggttgatga | ttatacgtta  | caatacactt  | tgaaccagcc | tgaaccgttc  | 540  |
| tggaactcta | agttgacctt | ttctatcttc  | tggcctctga  | atgaagaatt | cgaaacatca  | 600  |
| aaaggaagcg | atcttgctaa | accaacagat  | ccgacatcct  | tgctttataa | tggtccattc  | 660  |
| ttgttgaaag | ggttgactgc | aaaatcttct  | gtagagtttg  | taaaaaatga | gcaatattgg  | 720  |
| gataaagaaa | atgtccacct | agatactatc  | aattctagctt | actatgatgg | atcagatcag  | 780  |
| gagtcgctag | agcgtaactt | cactagtggg  | gcttatagtt  | atgcccgtct | ttaccctacc  | 840  |
| agctccaact | attctaaggt | tgcagaagaa  | tacaaggaca  | atatctatta | cacacaatca  | 900  |
| ggctctggga | ttgctgggtc | gggtgtgaat  | attgatcgcc  | aaagttacaa | ctatacttct  | 960  |
| aaaactacag | attcagagaa | agtagctact  | aagaaggcat  | tgcttaacaa | agatttccgt  | 1020 |
| caagccttga | atcttgctct | tgatcgctca  | gcttactcag  | ctcaaataca | tggtaaagat  | 1080 |
| ggagcagctt | tagcagttcg | taattttattt | gtaaaaccag  | actttgtttc | agctgggtgag | 1140 |
| aagacctttg | gtgatttagt | cgctgctcaa  | cttcctgctt  | atggtgatga | gtggaaaggt  | 1200 |
| gtgaatttag | ctgatgggca | ggatgggttta | ttcaatgctg  | acaaggccaa | ggcagagttt  | 1260 |
| gcgaaagcta | agaaagcttt | agaagcagac  | ggcgttcagt  | ttcctattca | tctggacggt  | 1320 |
| ccagtagacc | aagcatcaaa | aaactacata  | tctcgtattc  | agtcctttta | acaatctgta  | 1380 |
| gaaacagttc | ttggtgttga | aaatgtcggt  | gttgatattc  | aacaaatgac | aagtgatgaa  | 1440 |
| ttccttaata | ttacttacta | tgctgccaat  | gcttcatctg  | aggattggga | tgtatcagga  | 1500 |
| ggagtttcat | gggggccaga | ctatcaagac  | ccatctactt  | acctggatat | tttaaaaaca  | 1560 |
| actagcagtg | aaactacaaa | aacatattta  | ggatttgata  | atccaaatag | cccttcagta  | 1620 |
| gttcaagttg | gtttgaaaga | atacgataaa  | ttagttgatg  | aagctgccag | agagacaagc  | 1680 |
| gacttgaatg | tccgttatga | aaaatatgca  | gcggctcaag  | catggttgac | agatagttca  | 1740 |
| ctctttattc | ctgctatggc | ttcttctggt  | gcagcaccag  | tgctttcacg | aattgtttca  | 1800 |
| tttactggag | cttctgcgca | aacaggctct  | aaggggtcag  | atgtttactt | caaataatttg | 1860 |
| aaatcacaag | ataaagtggg | gactaaggaa  | gagtatgaaa  | aagctcgtga | aaaatggttg  | 1920 |
| aaagaaaaag | ctgaatcaaa | tgagaaagct  | caaaaagaat  | tggaaggtca | tgtgaag     | 1977 |

<210> 77  
 <211> 954  
 <212> DNA  
 <213> Streptococcus pneumoniae

|            |            |
|------------|------------|
| <400> 77   |            |
| atggaaatta | atgtgagtaa |
| attaagaaca | gatttgcctc |
| aagtcggcgt | gcaaccatat |
| aggcaagtac | acgcacactc |
| aactgggaat | ccgcattcaa |
| ccgtacagaa | tgaagcggat |
|            | 120        |

## 1028462\_1.TXT

|            |            |            |            |            |             |     |
|------------|------------|------------|------------|------------|-------------|-----|
| tatcactggc | ggaaagaccc | agaattaggt | tttttctcgc | acattgttgg | gaacggttgc  | 180 |
| atcatgcagg | taggacctgt | tgataatggt | gcctgggacg | ttgggggcg  | ttggaatgct  | 240 |
| gagacctatg | cagcggttga | actgattgaa | agccattcaa | ccaaagaaga | gttcatgacg  | 300 |
| gactaccgcc | tttatatcga | actcttacgc | aatctagcag | atgaagcagg | tttgccgaaa  | 360 |
| acgcttgata | cagggagttt | agctggaatt | aaaacgcacg | agtattgcac | gaataaccaa  | 420 |
| ccaaacaacc | actcagacca | cgttgaccct | tatccatata | ttgctaaatg | gggcatttagc | 480 |
| cgtgagcagt | ttaagcatga | tattgagaac | ggcttgacga | ttgaaacagg | ctggcagaag  | 540 |
| aatgacactg | gctactggta | cgtacattca | gacggctctt | atccaaaaga | caagtttgag  | 600 |
| aaaatcaatg | gcacttggtg | ctactttgac | agttcagggt | atatgcttgc | agaccgctgg  | 660 |
| aggaagcaca | cagacggcaa | ctggtactgg | ttcgacaact | caggcgaaat | ggctacaggc  | 720 |
| tggaagaaaa | tcgctgataa | gtggtactat | ttcaacgaag | aagggtgcat | gaagacaggc  | 780 |
| tgggtcaagt | acaaggacac | ttggtactac | ttagacgcta | aagaaggcgc | catggtatca  | 840 |
| aatgccttta | tccagtcagc | ggacggaaca | ggctggtact | acctcaaacc | agacggaaca  | 900 |
| ctggcagaca | agccagaatt | cacagtagag | ccagatggct | tgattacagt | aaaa        | 954 |

<210> 78  
 <211> 1401  
 <212> DNA  
 <213> Streptococcus pneumoniae

|            |   |
|------------|---|
| <400> 78   |   |
| atgaaaaaaa | aatattggac tttagcgata ttattctttt gtttgttcaa taattctggt 60   |
| actgctcaag | aaatacctaa aaatcttgat ggcaatataa ctacactca gactagcgaa 120   |
| agtttttctg | aatctgatga aaaacagggt gactattcta ataaaaatca agaagaagta 180  |
| gaccaaata  | aatttcgtat tcaaatcgat aagacagaat tatttgtaac aacagataaa 240  |
| catttagaaa | aaaactgttg taaattggaa cttgaaccac aaataaataa cgatattggt 300  |
| aactctgaaa | gtaataatctt actaggcgaa gataatttag ataataaaat taaggaaaat 360 |
| gtttctcatc | tagataatag aggaggaaat atagagcatg acaaagataa cttagaatcg 420  |
| tcgattgtaa | gaaaatatga atgggatata gataaagtta ctggtggagg cgaaagttat 480  |
| aaattatatt | ctaaaagtaa ttctaaagtt tcaattgcta ttttagattc aggagtcgat 540  |
| ttacaaaata | ctggattact gaaaaatctt tcaaactact caaaaaacta tgtccccaat 600  |
| aaaggatatt | taggaaaaga ggaggagag gaaggaataa tatcagatat tcaagataga 660   |
| ttaggtcatg | gtacggctgt tgtagctcaa attgtagggg atgacaatat taatggagta 720  |
| aatcctcacg | ttaatatata cgtctataga atatttggtg agtcgtcagc tagtccagat 780  |
| tggattgtaa | aagcaatctt tgatgctgta gatgatggca atgatattat caatcttagt 840  |

1028462\_1.TXT

|  |      |
|--|------|
| actggacaat atttaaatgat tgatggagaa tatgaggacg gaacaaatga ttttgaaaca | 900  |
| tttttgaagt ataaaaaggc tattgattac gcgaatcaaa aaggagtaat tatagtagct  | 960  |
| gcattagggga atgactccct aaatgtatca aatcagtcag atttattgaa acttattagt | 1020 |
| tcacgcaaaa aagtaagaaa accaggatta gtagttgatg ttccaagtta tttctcatct  | 1080 |
| acaatttcgg tcggaggcat agatcgctta ggtaatttat cagatttttag caataaaggg | 1140 |
| gattctgatg caatatatgc gcctgcaggc tcaacattat ctctttcaga attaggactt  | 1200 |
| aataacttta ttaatgcaga aaaatataaa gaagattgga ttttttcggc aacactagga  | 1260 |
| ggatatacgt atctttatgg aaactcattt gctgctccta aagtttctgg tgcgattgca  | 1320 |
| atgattattg ataaatacaa attaaaagat cagccctata attatatgtt tgtaaaaaaa  | 1380 |
| ttctggaaga aacattacca g  | 1401 |

<210> 79  
 <211> 924  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |     |
|--|-----|
| <400> 79<br>atgaaaaaag atgagttatt tgaaggcttt tacctaataca aatcagctga cctgaggcaa | 60  |
| actcgagctg ggaaaaacta cctagccttt accttccaag atgatagtgg cgagattgat              | 120 |
| gggaagctct gggatgcca acctcataac attgaggcct ttaccgcagg taaggttgtc               | 180 |
| cacatgaaag gacgccgaga agtttataac aatacccctc aagtcaatca aattactctc              | 240 |
| cgcctgcctc aagctggtga acccaatgac ccagctgatt tcaagggtcaa gtcaccagtt             | 300 |
| gatgtcaagg aaattcgtga ctacatgtcg caaatgattt tcaaaattga aaatcctgtc              | 360 |
| tggcaacgga ttgtccgaaa tctctacacc aagtatgata aggaattcta ctctatcca               | 420 |
| gctgccaaga ccaaccacca tgcctttgaa acgggcttgg cctatcatac ggcgaccatg              | 480 |
| gtgcgttttg cagacgctat tagcgaagtt tatcctcagc tcaataagag cctgctctat              | 540 |
| gcggggatta tgttgcatga cttagctaag gtcatcgagt tgacggggcc agaccagaca              | 600 |
| gagtacacag tgcgaggtaa tcttcttgga catatcgctc tcattgatag cgaaattacc              | 660 |
| aagacagtta tggaactcgg catcgatgat accaaggaag aagtcgtttt gcttcgtcat              | 720 |
| gtcatcctca gtcaccacgg cttgcttgag tatggaagcc cagtccgtcc acgcattatg              | 780 |
| gaagcagaga ttatccatat gattgacaat ctggatgcaa gcatgatgat gatgtcaaca              | 840 |
| gctcttgctt tgggtgataa aggagagatg accaataaaa tcttcgctat ggataatcgt              | 900 |
| tccttctata aaccagattt agat   | 924 |

<210> 80  
 <211> 663

## 1028462\_1.TXT

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 80

```

gtgacgattc taggaaaaga tacagttcaa caatctgcga aaggtgaatc tgtaactcaa      60
gaagctacac cagagtataa gctagaaaat acaccaggtg gagataaggg aggcaatact      120
ggaagctcag atgctaattgc gaatgaaggc ggtggttagcc aggcgggtgg atcagctcac      180
acagggttcac aaaactcagc tcaatcacia gcttctaagc aattagctac tgaaaaagaa      240
tcagctaaaa atgccattga aaaagcagcc aaggacaagc aggatgaaat caaaggcgca      300
ccgcttttctg ataaagaaaa agcagaactt ttagcaagag tggaagcaga aaaacaagca      360
gctctcaaaag agattgaaaa tgcgaaaact atggaagatg tgaaggaagc agaaacgatt      420
ggagtgcagc ccattgccat ggttacagtt cctaagagac cagtggctcc taatgctgct      480
cctaagacaa caagtgcacc gcaagcaact gcaggaacaa tgcaagatgt tacctaccag      540
tcacctgctg gcaaacaatt acctaacaca ggttcagcat caagtgcagc acttgctagt      600
cttggcttag tggtggcaac aagtggtttt gctttgctag gaagaaagac tagacgtaga      660
aaa                                                                663

```

&lt;210&gt; 81

&lt;211&gt; 1008

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 81

```

atgaatgcag atgatacagt aaccatttat gatgtcgcgc gtgaagcagg tgtttccatg      60
gcgacggtca gccgtgtggt caatggcaat aaaaatgtaa aagagaatac ccgtaaaaaa      120
gtgctagagg taattgatcg tttggattat cgtccaaatg cagttgcgcg tggctcttgca      180
agtaaaaaga caaccactgt cggtgtcgtg attccaaata ttaccaatgg ttatTTTTcG      240
agtttggcta aggggattga tgatattgca gaaatgtaca agtacaatat tgccttagct      300
aatagcgatg aagataacga gaaagaagtt tctgttgtca atacctctt ttcaaagcag      360
gtagatggca ttatctatat ggggtatcac ttgacagata aaattcgctc agaattttcG      420
cgttcacgta ctccgattgt tctcgcagga actgtcgatg ttgagcacca gttgccaaGT      480
gtcaatatTT actataagca agcaacaatt gatgcagtga gttaccttgc taaagaaaat      540
gagcgtattg ctttcgttag cggtccgcta gtggatgaca tcaatggtaa gggttcgttta      600
gttggctaca aggaaacctt gaaaaaagca ggaatcactt atagtgaggg tttggtatTT      660
gaatctaaat atagctatga tgatggttac gccttagcag agcgtttgat ttcacaaat      720
gcaactgcag cagttgtgac aggtgatgag ttggcagcag gagtcttgaa cggtttggct      780
gataagggtg tttctgtgcc agaagatttt gaaattatta ctagtgatga ttcacaaatc      840

```



## 1028462\_1.TXT

|            |            |            |            |            |            |      |
|------------|------------|------------|------------|------------|------------|------|
| tcacgcttta | cccgctcaaa | cttgacaacg | attgccaac  | ctctttatga | ccttggtgcc | 900  |
| attagtatgc | gtatgttgac | caagattatg | cataaggaag | agttggaaga | acgtgaagtt | 960  |
| ctcttacctc | atggtttgac | agaacgtagc | tcaacacgaa | aacgtaaa   |            | 1008 |

<210> 82  
 <211> 1407  
 <212> DNA  
 <213> Streptococcus pneumoniae

|            |            |             |            |            |            |      |
|------------|------------|-------------|------------|------------|------------|------|
| <400> 82   |            |             |            |            |            |      |
| atgaaaaaaa | agttagtatt | tcctaactctg | ttttggtggg | gagctgcttc | tagcggacct | 60   |
| cagacagaag | gtcaatatgg | aaaagtacat  | gaaaatgtga | tggactactg | gttcaaaacg | 120  |
| catccagaag | atTTTTTcga | taatgtcgga  | cctctttag  | ccagtaactt | ttttcatact | 180  |
| tacaccgaag | atttccactt | gatgaaggaa  | attggagtta | attctttccg | cacttccatc | 240  |
| caatggagtc | gactcatcaa | gaatttagag  | acaggtgagc | ctgatccaaa | aggtattgct | 300  |
| ttctacaatg | ccatcattga | agaagctaaa  | aagaaccaga | tggatcttgt | gatgaattta | 360  |
| catcattttg | atttaccagt | ggaacttctt  | caaaaatacg | gtggttgga  | aagcaaacat | 420  |
| gtagtggagt | tattcgtgaa | gtttgccaa   | actgctttca | catgctttgg | agataagggt | 480  |
| cattactgga | caactttcaa | tgagccaatg  | gtcattccag | aagcaggata | cttatatgct | 540  |
| ttccattatc | caaatctaaa | aggaaaggga  | aaagaggccg | tacaagtcac | ctataatcta | 600  |
| aaccttgcta | gtgcaaaagt | gattcaacta  | tatcgctcat | tagaacttga | tggaaagatt | 660  |
| gggattatTT | taaacttgac | acctgcttat  | ccaagaagta | attctccaga | agacttagaa | 720  |
| gcaagtcgat | ttacagatga | cttctttaac  | aaagtcttct | tgaatccagc | tgttaaagga | 780  |
| actttccag  | aaagattggt | aaaacagcta  | gagagagatg | gcgtgttatg | gagtcatacc | 840  |
| gaaaaagagc | ttcaactgat | gaaatcaaat  | acggttgatt | ttcttggagt | aaactactac | 900  |
| catccaaaac | gtgttcaagc | acaagcaaat  | cctgaggaat | atcagacgcc | ctggatgcca | 960  |
| gaccaatact | tcaaagagta | tgaatggctg  | gagcgtcgca | tgaatccata | tcgtgggttg | 1020 |
| gaaatTTTTc | cgaaagccat | ttatgatatt  | gctatgattg | tgaaggaaga | atatggtaat | 1080 |
| atcccatggt | ttatcagtga | aaacggaatg  | ggtgttgaaa | acgaagcacg | gtttatcgat | 1140 |
| gaaaatggag | ttatcgatga | cgtgtatcgt  | attgaatttt | atgaagaaca | tttaagatgg | 1200 |
| ctacataaag | ccattgaaga | gggaagtcac  | tgTTTTtgat | accacgcttg | gaccgcattt | 1260 |
| gattgctggt | cttggaataa | tgcatataag  | aatcgttacg | gatttatctc | cgttgattta | 1320 |
| gaaacgcaaa | agagaaccat | caagagctca  | ggaagatggt | atcgcaaagt | aagtgacaat | 1380 |
| aacggttttg | aagtagaaat | tgaggag     |            |            |            | 1407 |

<210> 83

## 1028462\_1.TXT

&lt;211&gt; 408

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 83

```

gtggaaaatc ttacgaatct ttacgaaaag tatcgtgtct atctgactcg tccacgttta      60
gagcttttgg cagtagttac cattgttttc tgtgctgtac tcgtcttttt tctaaatatt    120
ccaggaaaag gtgtctttaa actcgataat ggaacgattg tttatgatgg cagtcttgtc     180
cgcggtaaaa tgaatggcca aggtaccatt accttccaaa atggagacca atatacaggt     240
ggcttcaaca atggagcctt caacggaaaa ggtacctttc aatctaaaga aggctggacc     300
tacgaagggtg attttgtaaa tggtcagggt gaaggaaaag ggaaactaac aacagaacaa     360
gaagtcgttt atgaaggaac ttttaacaa ggcgtttttc aacaaaaa                   408

```

&lt;210&gt; 84

&lt;211&gt; 621

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 84

```

atgttgaata agataagaga ctatttagac tttgctgggt tgcagtaccg taatcctgat      60
aaagcgggag cagagcgaga gaagatgctg gcattccgcc acaaaggaca agaggcccga    120
aagggtttta cagaactggc caaagccttt caagcaagcc atccagaatg gcaactccaa     180
cagactagcc agtggatgaa tcaggcccag cgtttgagac cacatttttg ggtttatcta     240
cagagagacg gacaagtgac agaacctatg atggccttac gtttgatgg gacatctact     300
gactttggaa tttctttgga agtcagtttc atcgaacgta agaaggatga gcaaactctg     360
ggcaagcagg ccaaagtttt agacattcca accgttaaag ggatttatta tctaacctac     420
tctaattggtc aaagtcaacg gtgggaggcg aatgaagaaa agcgtcgtac tttacgcgag     480
aagggtgagaa gtcaagaagt tcgaaaagtt ttagtgaagg tagatgttcc tatgacagaa     540
aattcgtctg aagaagaaat cgtagaaggc ttattgaagt cttattctaa aattcttccc     600
tattatctag ctacgagaaa a                                           621

```

&lt;210&gt; 85

&lt;211&gt; 459

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 85

```

atggttcaga acagtgtgtg gcaatcaaag agccataagg tcaaggcttt taccttggtta      60
gaatccctgc ttgccctcat tgtcatcagt gggggattac tcctttttca agctatgagt    120
cagctcctca tttcagaagt tcgctaccag caacaaagcg agcaaaagga gtggctcttg     180
tttgtggacc aacttgaggt agaattagac cgttcgcagt tcgaaaaagt agaaggcaat     240

```

1028462\_1.TXT

|  |     |
|--|-----|
| cgcctataca tgaagcaaga tggcaaggac atcgccatcg gtaagtcaaa gtcagatgat  | 300 |
| ttccgtaaaa cgaatgctcg tggtcgaggt tatcagccta tggtttatgg actcaaactct | 360 |
| gtacggatta cagaggacaa tcaactgggt cgctttcatt tccagttcca aaaaggctta  | 420 |
| gaaagggagt tcattctatcg tgtggaaaaa gaaaaaagt                        | 459 |

<210> 86  
 <211> 324  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |     |
|--|-----|
| <400> 86   |     |
| atgaaaaaaa tgatgacatt cttgaaaaaa gctaagggtta aagcttttac attggtggag | 60  |
| atgttggtgg tcttgctgat tatcagcgtg cttttcttgc tctttgtacc taatctgacc  | 120 |
| aagcaaaaag aagcagtcaa tgacaaagga aaagcagctg ttgttaaggt ggtggaaagc  | 180 |
| caggcagaac tttatagctt agaaaagaat gaagatgcta gcctaagaaa gttacaagca  | 240 |
| gatggacgca tcacggaaga acaggctaaa gcttataaag aatacaatga taaaaatgga  | 300 |
| ggagcaaadc gttaaagtcaa tgat  | 324 |

<210> 87  
 <211> 897  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |     |
|--|-----|
| <400> 87   |     |
| atgacatcaa aagttagaaa ggcagtcac cctgctgctg gactaggaac tcgattttta   | 60  |
| ccagcaacca aggcccttgc caaagaaatg ttgccaatcg tagacaaacc aactatccag  | 120 |
| tttatcgtgg aagaagctct caaatcaggt attgaagata ttctagttgt cactggtaaa  | 180 |
| tcaaaacgtt ctattgagga ccactttgat tcaaacttcg aattggaata taacctcaaa  | 240 |
| gaaaaagggg aaacagatct tttgaagcta gttgataaaa caactgacat gcgtctgcat  | 300 |
| tttatccgcc aaactcatcc acgcggtctc ggagatgctg ttttgcaagc caaggctttc  | 360 |
| gtcggaaatg aaccttttgt cgttatgctt ggtgatgact tgatggatat cacagacgaa  | 420 |
| aaggctgttc cacttaccaa acaactcatg gatgactacg agcgtaccca cgcgtctact  | 480 |
| atcgctgtca tgccagtccc tcatgacgaa gtatctgctt acgggggttat tgctccgcaa | 540 |
| ggcgaaggaa aagatggtct ttacagtgtt gaaacctttg ttgaaaaacc agctccagag  | 600 |
| gacgctccta gcgaccttgc tattatcgga cgctacctcc tcacgcctga aatttttgag  | 660 |
| attctcgaaa agcaagctcc aggtgcagga aatgaaattc agctgacaga tgcaatcgac  | 720 |
| accctcaata aaacacaacg tgtatttgct cgtgagttca aaggggctcg ttacgatgtc  | 780 |
| ggagacaagt ttggcttcat gaaaacatcc atcgactacg ccctcaaaca cccacaagtc  | 840 |
| aaagatgatt tgaagaatta cctcatccaa cttggaaaag aattgactga gaaggaa     | 897 |

## 1028462\_1.TXT

<210> 88  
 <211> 2463  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 88  
 atgcaaaatc aattaaatga attaaaacga aaaatgctgg aattttttcca gcaaaaacaa 60  
 aaaaataaaa aatcagctag acctggcaag aaaggttcaa gtaccaaaaa atctaaaacc 120  
 ttagataagt cagtcattttt cccagctatt ttactgagta taaaagcctt atttaactta 180  
 ctctttgtac tcggttttct aggaggaatg ttgggagctg ggattgcttt gggatacgga 240  
 gtggccttat ttgacaaggt tcgggtgcct cagacagaag aattggtgaa tcagggtcaag 300  
 gacatctctt ctatttcaga gattacctat tcggacggga cggtgattgc ttccatagag 360  
 agtgatttgt tgcgcacttc tatctcatct gagcaaattt cggaatctt gaagaaggct 420  
 atcattgcga cagaagatga acacttttaa gaacataagg gtgtagtacc caaggcgggtg 480  
 attcgtgcga ccttggggaa atttgtaggt ttgggttcct ctagtggggg ttcaaccttg 540  
 acccagcaac taattaaaca gcagggtggtt ggggatgctc cgaccttggc tcgtaaggcg 600  
 gcagagattg tggatgctct tgccttgga cgcgccatga ataaagatga gattttaacg 660  
 acctatctca atgtggctcc ctttggccga aataataagg gacagaatat tgcaggggct 720  
 cggcaagcag ctgagggaat tttcgggtga gatgccagtc agttgactgt tcctcaagca 780  
 gcatttttag caggacttcc acagagtccc attacttact ctctttatga aaatactggg 840  
 gagttgaaga gtgatgaaga cctagaaatt ggcttaagac gggctaaggc agttctttac 900  
 agtatgtatc gtacagggtc attaaagcaa gacgagtatt ctcagtacaa ggattatgac 960  
 cttaaacagg actttttacc atcgggcacg gttacaggaa tttcacgaga ctatttatac 1020  
 tttaacactt tggcagaagc tcaagaacgt atgtatgact atctagctca gagagacaat 1080  
 gtctccgcta aggagttgaa aaatgaggca actcagaagt tttatcgaga tttggcagcc 1140  
 aaggaaattg aaaatggttg ttataagatt actactacca tagatcagaa aattcattct 1200  
 gccatgcaaa gtgcggttgc tgattatggc tatcttttag acgatggaac aggtcgtgta 1260  
 gaagtaggga atgtcttgat ggataaccaa acagggtgcta ttctaggctt tgtagggtgt 1320  
 cgtaattatc aagaaaatca aaataatcat gcctttgata ccaaacgttc gccagcttct 1380  
 actaccaagc ccttgctggc ctacgggtatt gctattgacc agggcttgat ggggaagtga 1440  
 acgattctat ctaactatcc aacaaacttt gctaattggca atccgattat gtatgcta 1500  
 agcaagggaa caggaatgat gaccttgga gaagctctga actattcatg gaatatccct 1560  
 gcttactgga cctatcgtat gctccgtgaa aagggtgttg atgtcaaggg ttatatggaa 1620  
 aagatggggtt acgagattcc tgagtacggt attgagagct tgccaatggg tgggtggtatt 1680

## 1028462\_1.TXT

|            |             |            |            |            |             |      |
|------------|-------------|------------|------------|------------|-------------|------|
| gaagtcacag | ttgccagca   | taccaatggc | tatcagacct | tagctaataa | tggagtttat  | 1740 |
| catcagaagc | atgtgatttc  | aaagattgaa | gcagcagatg | gtagagtggg | gtatgagtat  | 1800 |
| caggataaac | cggttcaagt  | ctattcaaaa | gctactgcga | cgattatgca | gggattgcta  | 1860 |
| cgagaagttc | tatcctctcg  | tgtgacaaca | accttcaagt | ctaacctgac | ttctttaaat  | 1920 |
| cctactctgg | ctaattgcaga | ttggattggg | aagactggta | caaccaacca | agacgaaaat  | 1980 |
| atgtggctca | tgctttcgac  | acctagatta | accctaggtg | gctggattgg | gcatgatgat  | 2040 |
| aatcattcat | tgtcacgtag  | agcaggttat | tctaataact | ctaattacat | ggctcatctg  | 2100 |
| gtaaatgcga | ttcagcaagc  | ttccccaagc | atgtggggga | acgagcgctt | tgcttttagat | 2160 |
| cctagtgtag | tgaaatcgga  | agtcttgaaa | tcaacaggtc | aaaaaccaga | gaaggtttct  | 2220 |
| gttgaaggaa | aagaagtaga  | ggtcacaggt | tcgactgtta | ccagctattg | ggctaataag  | 2280 |
| tcaggagcgc | cagcgacaag  | ttatcgcttt | gctattggcg | gaagtgatgc | ggattatcag  | 2340 |
| aatgcttggg | ctagtattgt  | ggggagtcta | ccaactccat | ccagctccag | cagttcaagt  | 2400 |
| agtagttcta | gcgatagcag  | taactcaagt | actacacgac | cttcttcttc | aagggcgaga  | 2460 |
| cga        |             |            |            |            |             | 2463 |

&lt;210&gt; 89

&lt;211&gt; 1269

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 89

|            |             |            |             |             |             |     |
|------------|-------------|------------|-------------|-------------|-------------|-----|
| atgtcatcta | aatttatgaa  | gagcgctgcg | gtgcttggaa  | ctgctacact  | tgctagcttg  | 60  |
| cttttggtag | cttgcggaag  | caaaactgct | gataagcctg  | ctgattctgg  | ttcatctgaa  | 120 |
| gtcaaagaac | tactgtata   | tgtagacgag | ggatataaga  | gctatattga  | agaggttgct  | 180 |
| aaagcttatg | aaaaagaagc  | tggagtaaaa | gtcactctta  | aaactgggtga | tgctctagga  | 240 |
| ggctttgata | aactttctct  | tgacaaccaa | tctggtaatg  | tccctgatgt  | tatgatggct  | 300 |
| ccatacgacc | gtgtaggtag  | ccttggttct | gacggacaac  | tttcagaagt  | gaaattgagc  | 360 |
| gatggtgcta | aaacagacga  | cacaactaaa | tctcttgtaa  | cagctgctaa  | tggtaaagtt  | 420 |
| tacggtgctc | ctgccgttat  | cgagtcactt | gttatgtact  | acaacaaaga  | cttgggtgaaa | 480 |
| gatgctccaa | aaacatttgc  | tgacttggaa | aaccttgcta  | aagatagcaa  | atacgcattc  | 540 |
| gctggtgaag | atggtaaaac  | tactgccttc | ctagctgact  | ggacaaactt  | ctactataca  | 600 |
| tatggacttc | ttgccggtaa  | cggtgcttac | gtctttggcc  | aaaacggtaa  | agacgctaaa  | 660 |
| gacatcggtc | ttgcaaacga  | cggttctatc | gtaggtatca  | actacgctaa  | atcttgggtac | 720 |
| gaaaaatggc | ctaaagggtat | gcaagataca | gaagggtgctg | gaaacttaat  | ccaaactcaa  | 780 |
| ttccaagaag | gtaaaacagc  | tgctatcatc | gacggacctt  | ggaaagctca  | agcctttaaa  | 840 |

1028462\_1.TXT

|  |      |
|--|------|
| gatgctaaag taaactacgg agttgcaact atcccaactc ttccaaatgg aaaagaatat  | 900  |
| gctgcattcg gtggtggtaa agcttggggtc attcctcaag ccgttaagaa ccttgaagct | 960  |
| tctcaaaaat ttgtagactt ccttggttgca actgaacaac aaaaagtatt atatgataag | 1020 |
| actaacgaaa tcccagctaa tactgaggct cgttcatacg ctgaaggtaa aaacgatgag  | 1080 |
| ttgacaacag ctgttatcaa acagttcaag aacactcaac cactgccaaa catctctcaa  | 1140 |
| atgtctgcag tttgggatcc agcgaaaaat atgctctttg atgctgtaag tgggtcaaaaa | 1200 |
| gatgctaaaa cagctgctaa cgatgctgta acattgatca aagaaacaat caaacaaaaa  | 1260 |
| tttggtgaa  | 1269 |

<210> 90  
 <211> 465  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |     |
|--|-----|
| <400> 90<br>atgatagata aagtgggtcag gaacctactc ctgacctttt tcttttgcaa aatgacaaaa | 60  |
| atcataatTT ttttgacaac tatacttgtc aaaaagaaaa agatatgtta caatgaattc              | 120 |
| aagttaagaa ataggaagca gaaaggagtt ataatgtggg tactaggatt tatactatTT              | 180 |
| atgattttct tttattctaa taattctaaa aaaatcaaga aactagagaa taaaatcaaa              | 240 |
| agacttgagc gaaaagagaa aggaaacgca gaaatgtcga gattattaca agaatgatt               | 300 |
| ggaaaggaac caattataac gggagtgtat attgggccag ataactggga agttgtggat              | 360 |
| gttgatgagg aatgggtaaa gctacgacgt gtagataata cgggaaaaga aaaattcaag              | 420 |
| ttgcaacgta ttgaggatat ccaaaccgtt gaatttgacg gagag                              | 465 |

<210> 91  
 <211> 855  
 <212> DNA  
 <213> Streptococcus pneumoniae

|   |     |
|---|-----|
| <400> 91<br>atgattttta gtaaaaatag agaagatggg ttaagaaaat ttgcgactaa catccgatta | 60  |
| aatactctta gaacattgaa tcatcttgga ttcggacatt acggaggaag tctgtctatc             | 120 |
| gtagaagttt tagcggtgct ttatggtgaa ataatgccaa tgactccaga aatatttgca             | 180 |
| gcacgagata gagattatTT catattatca aaagggtcacg gaggaccagc tctatacagt            | 240 |
| acactctatt tgaatggttt ctttgacaaa gaattcttat attctttaaa tacaatgga              | 300 |
| accaaattac cgtctcatcc tgatagaaat ctaacgccag gcatagatat gacaacgggc             | 360 |
| tctttaggac aaggaattag tgttgcaact ggacttgcatt atgggtcagag aataagaaag           | 420 |
| agtccttttt atacttacgc tattgttgga gatggtgagt taaatgaggg acaatgttgg             | 480 |

## 1028462\_1.TXT

|   |     |
|---|-----|
| gaggctatac agtttgcttc tcatcaacag ttatccaact taattgtatt tgttgatgat   | 540 |
| aacaaaaaac aattagatgg ttttacaag gatatttgta atccaggatga tttcgtagaa   | 600 |
| aaattttcag catttggaatt tgaatccatt aggggtcaagg gttcagatat tagagaaatt | 660 |
| tatgaaggga ttgtccaatt aaaacagtca aataattcat cacctaagtg cattgtatta   | 720 |
| gatactatta aagggtcaagg ggttcaagag ctggaagaaa tgaaatccaa tcatcatctt  | 780 |
| cgccctactg tagaggagaa acaaagtta acttcagttg tagaaagatt aagtcaggaa    | 840 |
| ttggaggaaa cagaa  | 855 |

<210> 92  
 <211> 1863  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |      |
|--|------|
| <400> 92   |      |
| atgaaaaaaa ctacaatatt atcattaact acagctgcgg ttattttagc agcatatgtc  | 60   |
| cctaataaac caatcctagc agatactcct agttcggaag taatcaaaga gactaaagtt  | 120  |
| ggaagtatta ttcaacaaaa taatatcaaa tataaggttc taactgtaga aggtaacata  | 180  |
| ggaactgttc aagtgggtaa tggagttact cctgtagagt ttgaagctgg tcaagatgga  | 240  |
| aaaccattca cgattcctac aaaaatcaca gtaggtgata aagtatttac cgttactgaa  | 300  |
| gtagctagtc aagcttttag ttattatcca gatgaaacag gtagaattgt ctactatcct  | 360  |
| agctctatta ctatcccatc aagcataaaa aaaatacaaa aaaaaggctt ccatggaagt  | 420  |
| aaagctaaaa ctattatttt tgacaaaggc agtcagctgg agaaaattga agatagagct  | 480  |
| tttgattttt ctgaattaga agagattgaa ttgcctgcat ctctagaata tattggaaca  | 540  |
| agtgcatttt ctttttagtca aaaattgaaa aagctaacct tttcctcaag ttcaaaatta | 600  |
| gaattaatat cacatgaggc ttttgctaatt ttatcaaatt tagagaaact aacattacca | 660  |
| aaatcggtta aaacattagg aagtaatcta tttagactca ctactagctt aaaacatggt  | 720  |
| gatgttgaag aaggaaatga atcgtttgcc tcagttgatg gtgttttggt ttcaaaagat  | 780  |
| aaaacccaat taattttatta tccaagtcaa aaaaatgacg aaagttataa aacgcctaag | 840  |
| gagacaaaag aacttgcata atattcgttt aataaaaatt cttacttgaa aaaactcgaa  | 900  |
| ttgaatgaag gtttagaaaa aatcgggtact tttgcatttg cagatgcat taaacttgaa  | 960  |
| gaaattagct taccaaatag tttagaaact attgaacgtt tagcctttta cggtaattha  | 1020 |
| gaattaaaag aacttatatt accagataat gttaaaaatt ttggtaaaca cgttatgaac  | 1080 |
| ggttttacca aattaaaaag ttttaacaatt ggtaataata tcaactcatt gccgtccttc | 1140 |
| ttcctaagtg gcgtcttaga ttcattaaag gaaattcata ttaagaataa aagtacagag  | 1200 |
| ttttctgtga aaaaagatac atttgcaatt cctgaaactg ttaagttcta tgtaacatca  | 1260 |

## 1028462\_1.TXT

gaacatataa aagatgttct taaatcaaat ttatctacta gtaatgatat cattgttgaa 1320  
 aaagtagata atataaaaca agaaactgat gtagctaaac ctaaaaagaa ttctaatacag 1380  
 ggagtagttg gttgggttaa agacaaagggt ttatggtatt acttaaacga atcagggttca 1440  
 atggctactg gttgggttaa agacaaagggt ttatggtatt acttaaacga atcagggttca 1500  
 atggctactg gttgggttaa agacaaaggc ttatggtact acttaaatga atcagggttca 1560  
 atggctactg gttgggttaa agacaaaggc ttatggtatt acttaaacga atcagggttca 1620  
 atggctactg gttgggttaa agacaaaggc ttatggtact acttaaatga atcagggttca 1680  
 atggctactg gttgggttaa agacaaaggc ttatggtatt acttaaatga atcagggttca 1740  
 atggctactg gttgggttac agtttctggt aaatggtact atacctataa ttcaggagat 1800  
 ttattagtaa acacgactac acccgatggc tatcgagtca atgctaacgg tgagtgggta 1860  
 gga 1863

<210> 93  
 <211> 1878  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 93  
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 cacatttctc taccagatgt ggaagtggct gtcactcagt ctgaccaagc atctatctct 120  
 atcgaggggtg aggaagggtca ctatcaattg acctaccgca aacctcacca actttatcgt 180  
 gccttgtcct tgttggtaac agttctagca gaagctgata aagtagagat tgaggaacaa 240  
 gcagcttacg aagatttggc ttacatggtt gactgttctc gaaatgcggg gctgaatgtg 300  
 gcttctgcc agcagatgat tgagatatgg gctctcatgg gctactcaac ctttgagctt 360  
 tacatggaag acacttacca gattgaagggt cagccttact ttggctatct ccgtggagct 420  
 tattcagcag aggagttgca ggaaatcgaa gcctatgcc aacagtttga cgtgaccttt 480  
 gtaccatgca tccagacctt ggcccacttg tcggcctttg tcaaattgggg tgtcaaggaa 540  
 gtgcaggagc tccgtgatgt agaggacatt cttctcattg gcgaagaaaa ggtttatgac 600  
 ttgattgatg gcatgtttgc cacgttgtct aaactgaaga ctcgcaagggt caatatcggg 660  
 atggacgaag cccacttggg tggtttggga cgctacctga ttctgaacgg tgttggtgat 720  
 cgtagtctcc tcatgtgcc acaattggag cgcgtgctgg atattgctga caaatatggg 780  
 ttccactgcc agatgtggag tgatatgttc ttcaaactca tgtcagcgga tggccagtac 840  
 gaccgtgatg tggaaattcc agaggaaact cgtgtctacc tagaccgtct caaagaccgt 900  
 gtgactctgg ttactggga ttattatcag gatagcgagg aaaaatacaa ccgtaatttc 960  
 cgcaatcatc acaagattag ccatgacctt gcatttgcag ggggagcttg gaagtggatt 1020



1028462\_1.TXT

|   |      |
|---|------|
| ggcttttacac ctcacaacca ttttagccgt ctagtggcta tcgaggctaa taaagcctgc  | 1080 |
| cgtgccaatc agattaaaga agtcatcgta acgggttggg gagacaatgg tggtgaaact   | 1140 |
| gcccgattct ctatcctacc aagcttgcaa atctgggcag aactcagcta tcgcaatgac   | 1200 |
| ctagatgggtt tgtctgcgca cttcaagacc aatactggtc taacggttga ggattttatg  | 1260 |
| cagattgacc ttgccaacct cttaccagac ctaccaggca atctcagcgg tatcaatccc   | 1320 |
| aaccgctatg ttttttatca ggatattctt tgtccgattc ttgatcaaca catgacacct   | 1380 |
| gaacaggaca aaccgcactt cgctcaggct gctgagacgc ttgctaacat taaagaaaaa   | 1440 |
| gctggaaact atgcctatct ctttgaaact caggcccagt tgaatgctat ttttaagtagc  | 1500 |
| aaagtagatg tgggacgacg cattcgtcag gcctaccaag cggatgataa agaaagttta   | 1560 |
| caacaaatcg ccagacaaga attaccagaa cttagaagcc aaattgaaga cttccatgcc   | 1620 |
| ctcttttagcc accaatggct gaaagaaaac aagggtctttg gtttggtatc agttgacatc | 1680 |
| cgtatgggcg gactcttgca acgcatcaaa cgagcagaaa gccgtatcga ggtttatctg   | 1740 |
| gctggtcagc ttgaccgcat cgacgagctg gaagttgaaa tcctaccatt tactgacttc   | 1800 |
| tacgcagaca aggatttcgc agcaactaca gcccaaccagt ggcataccat tgcgacagcg  | 1860 |
| tcgacgattt atacgact   | 1878 |

<210> 94  
 <211> 831  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |     |
|--|-----|
| <400> 94   |     |
| atgtctaatt catttgtcaa gttgttagtc tctcaattat ttgcaaattt agcagatatt  | 60  |
| ttcttttagag taacaatcat tgctaacata tacattatct caaaatcagt aattgccaca | 120 |
| tcactagttc ctatcttaat aggaatatcc tcttttgttg cgagtctttt agttccggtg  | 180 |
| gttactaaaa ggtagcgct aaataggggt ttatctttat ctcaatttgg aaagactata   | 240 |
| ttattggcga tactggtagg aatgtttacc gtaatgcaat ccgtagcgcc tttggtgacc  | 300 |
| tatctatttg ttgttgcaat ttccatacta gatggttttg cagcaccctg ttcctatgct  | 360 |
| attgtgccac gctatgacg cgatttgggt aaggctaatt cagccttatc aatgactggt   | 420 |
| gaagctgttc aattgatagg ttggggatta ggtggactct tgtttgcaac aattggtctg  | 480 |
| ttacctacca cgtgtatcaa tttagtcttg tatatcattt ctagctttct gatgttattt  | 540 |
| cttcctaacg ctgaagtgga ggtgttagag tcagaaacta atcttgaaat tttgctcaaa  | 600 |
| ggttggaagt tagttgctag aaatcctaga ttaagacttt ttgtatcagc aaattttattg | 660 |
| gaaatttttt caaatacgat ttgggtttct tccattatac ttgtttttgt aacggagtta  | 720 |
| ttaaataaaa cggaaagtta ctggggatat tctaatacag catactctat tgggtattata | 780 |

attagtggtct taattgcttt taggctatct gaaaagttcc ttgctgctaa a 831

<210> 95  
 <211> 2079  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 95  
 atgtttgcat caaaaagcga aagaaaagta cattattcaa ttcgtaaatt tagtgttgga 60  
 gtagctagtg tagttgttgc cagtcttggt atgggaagtg tggttcatgc gacagagaac 120  
 gagggagcta cccaagtacc cacttcttct aatagggcaa atgaaagtca ggcagaacaa 180  
 ggagaacaac ctaaaaaact cgattcagaa cgagataagg caaggaaaga ggtcgaggaa 240  
 tatgtaaaaa aaatagtggg tgagagctat gcaaaatcaa ctaaaaagcg acatacaatt 300  
 actgtagctc tagttaacga gttgaacaac attaagaacg agtatttgaa taaaatagtt 360  
 gaatcaacct cagaaagcca actacagata ctgatgatgg agagtcgatc aaaagtagat 420  
 gaagctgtgt ctaagtttga aaaggactca tcttcttcgt caagttcaga ctcttccact 480  
 aaaccggaag cttcagatac agcgaagcca aacaagccga cagaaccagg agaaaaggta 540  
 gcagaagcta agaagaaggt tgaagaagct gagaaaaaag ccaaggatca aaaagaagaa 600  
 gatcgtcgta actaccaac cattacttac aaaacgcttg aacttgaaat tgctgagtcc 660  
 gatgtggaag ttaaaaaagc ggagcttgaa ctagtaaaag tgaaagctaa cgaacctcga 720  
 gacgagcaaa aaattaagca agcagaagcg gaagttgaga gtaaacaagc tgaggctaca 780  
 aggttaaaaa aaatcaagac agatcgtgaa gaagcagaag aagaagctaa acgaagagca 840  
 gatgctaaag agcaaggtaa accaaagggg cgggcaaac gaggagttcc tggagagcta 900  
 gcaacacctg ataaaaaaga aaatgatgcy aagtcttcag attctagcgt aggtgaagaa 960  
 actcttccaa gcccatccct gaaaccagaa aaaaaggtag cagaagctga gaagaagggt 1020  
 gaagaagcta agaaaaaagc cgaggatcaa aaagaagaag atcgccgtaa ctaccaacc 1080  
 aatacttaca aaacgcttga acttgaaatt gctgagtccg atgtggaagt taaaaaagcg 1140  
 gagcttgaac tagtaaaaga ggaagctaag gaacctcgaa acgaggaaaa agttaagcaa 1200  
 gcaaaagcgg aagttgagag taaaaaagct gaggctacaa ggtagaaaa aatcaagaca 1260  
 gatcgtaaaa aagcagaaga agaagctaaa cgaaaagcag cagaagaaga taaagttaaa 1320  
 gaaaaaccag ctgaacaacc acaaccagcg ccggctccaa aagcagaaaa accagctcca 1380  
 gctccaaaac cagagaatcc agctgaacaa ccaaaagcag aaaaaccagc tgatcaacaa 1440  
 gctgaagaag actatgctcg tagatcagaa gaagaatata atcgcttgac tcaacagcaa 1500  
 ccgcaaaaaa ctgaaaaacc agcacaacca tctactccaa aaacaggctg gaaacaagaa 1560  
 aacggtatgt ggtacttcta caatactgat ggttcaatgg cgacaggatg gctccaaaac 1620

1028462\_1.TXT

|   |      |
|---|------|
| aatggctcat ggtactacct caacagcaat ggcgctatgg cgacaggatg gctccaaaac   | 1680 |
| aatggttcat ggtactatct aaacgctaata ggttcaatgg caacaggatg gctccaaaac  | 1740 |
| aatggttcat ggtactacct aaacgctaata ggttcaatgg cgacaggatg gctccaatac  | 1800 |
| aatggctcat ggtactacct aaacgctaata ggttcaatgg cgacaggatg gctccaatac  | 1860 |
| aatggctcat ggtactacct aaacgctaata ggtgatatgg cgacagggtg ggtgaaagat  | 1920 |
| ggagatacct ggtactatct tgaagcatca ggtgctatga aagcaagcca atgggttcaaa  | 1980 |
| gtatcagata aatgggtacta tgtcaatggc tcagggtgccc ttgcagtcaa cacaactgta | 2040 |
| gatggctatg gagtcaatgc caatggtgaa tgggtaaac                          | 2079 |

<210> 96  
 <211> 2430  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |      |
|--|------|
| <400> 96   |      |
| atgaactatt caaaagcatt gaatgaatgt atcgaaagtg cctacatggg tgctggacat  | 60   |
| tttgagagctc gttatctaga gtcgtggcac ttgttgattg ccatgtctaa tcacagttat | 120  |
| agtgtagcag gggcaacttt aaatgattat ccgtatgaga tggaccgttt agaagagggtg | 180  |
| gctttggaac tgactgaaac ggactatagc caggatgaaa cctttacgga attgccgttc  | 240  |
| tcccgtcgtt tgcaggttct ttttgatgaa gcagagtatg tagcgtcagt ggtccatgct  | 300  |
| aagggtactag ggacagagca cgtcctctat gcgattttgc atgatagcaa tgccttggcg | 360  |
| actcgtatct tggagagggc tgggttttct tatgaagaca agaaagatca ggtcaagatt  | 420  |
| gctgctcttc gtcgaaattt agaagaacgg gcaggctgga ctcgtgaaga tctcaaggct  | 480  |
| ttacgccaac gccatcgtac agtagctgac aagcaaaatt ctatggccaa tatgatgggc  | 540  |
| atgccgcaga ctcctagtgg tggctctgag gattatacgc atgatttgac agagcaagcg  | 600  |
| cgttctggca agttagaacc agtcatcggc cgggacaagg aaatctcacg tatgattcaa  | 660  |
| atcttgagcc ggaagactaa gaacaaccct gtcttggttg gggatgctgg tgtcgggaaa  | 720  |
| acagctctgg cgcttgggtct tgcccagcgt attgctagtg gtgacgtgcc tgcggaaatg | 780  |
| gctaagatgc gcgtgttaga acttgatttg atgaatgtcg ttgcagggac acgcttccgt  | 840  |
| ggtgactttg aagaacgcat gaataatatc atcaaggata ttgaagaaga tggccaagtc  | 900  |
| atcctcttta tcgatgaact ccacaccatc atgggttctg gtagcgggat tgattcgact  | 960  |
| ctggatgcgg ccaatatctt gaaaccagcc ttggcgcgtg gaactttgag aacggttggt  | 1020 |
| gccactactc aggaagaata tcaaaaacat atcgaaaaag atgcggcact ttctcgtcgt  | 1080 |
| ttcgctaaag tgacgattga agaaccaagt gtggcagata gtatgactat tttaacaggt  | 1140 |
| ttgaaggcga cttatgagaa acatcacctg gtacaaatca cagatgaagc ggttgaaaca  | 1200 |

1028462\_1.TXT

|             |            |             |            |            |            |      |
|-------------|------------|-------------|------------|------------|------------|------|
| gcggttaaga  | tggctcatcg | ttattttaacc | agtcgtcact | tgccagactc | tgctatcgat | 1260 |
| ctcttg gatg | aggcggcagc | aacagtgcaa  | aataaggcaa | agcatgtaaa | agcagacgat | 1320 |
| tcagatttga  | gtccagctga | caaggccctg  | atggatggca | agtggaaaca | ggcagcccag | 1380 |
| cta atcgcaa | aagaagagga | agtacctgtc  | tacaaagact | tggtgacaga | gtctgatatt | 1440 |
| ttgaccacct  | tgagtcgctt | gtcaggaatc  | ccagttcaaa | aactgactca | aacggatgct | 1500 |
| aagaagtatt  | taaatcttga | agcagaactc  | cataaacggg | ttatcggtca | agatcaagct | 1560 |
| gtttcaagca  | ttagccgtgc | cattcgccgc  | aaccagtcag | ggattcgag  | tcataagcgt | 1620 |
| ccgattgggt  | cctttatgtt | cctagggcct  | acaggtgtcg | ggaaaactga | attagccaag | 1680 |
| gctctggcag  | aagttctttt | tgacgacgaa  | tcagccctta | tccgctttga | tatgagtga  | 1740 |
| tatatggaga  | aatttgcagc | tagtcgtctc  | aacggagctc | ctccaggcta | tgtaggatat | 1800 |
| gaagaagggt  | gggagttgac | agagaagggt  | cgcaataaac | cctattccgt | tctcctcttt | 1860 |
| gatgaggtag  | agaaggccca | cccagatata  | tttaatgttc | tcttgaggt  | tctggatgac | 1920 |
| gggtgtcttga | cagatagcaa | gggacgcaag  | gtcgattttt | caaataccat | tatcattatg | 1980 |
| acatcgaatc  | taggtgacg  | tgcccttcgt  | gatgataaga | ctgttggttt | tggggctaag | 2040 |
| gatattcggt  | ttgaccagga | aaatatggaa  | aaacgcatgt | ttgaagaact | gaaaaaagct | 2100 |
| tatagaccgg  | aattcatcaa | ccgtattgat  | gagaagggtg | tcttccatag | cctatctagt | 2160 |
| gatcatatgc  | aggaagtgg  | gaagattatg  | gtcaagcctt | tagtggcaag | tttgactgaa | 2220 |
| aaaggcattg  | acttgaaatt | acaagcttca  | gctctgaaat | tgttagcaaa | tcaaggatat | 2280 |
| gaccagaga   | tgggagctcg | cccacttcgc  | agaaccctgc | aaacagaagt | ggaggacaag | 2340 |
| ttggcagaac  | ttcttctcaa | gggagattta  | gtggcaggca | gcacacttaa | gattgggtgc | 2400 |
| aaagcaggcc  | agttaaaatt | tgatattgca  |            |            |            | 2430 |

<210> 97  
 <211> 1344  
 <212> DNA  
 <213> Streptococcus pneumoniae

|            |            |             |            |            |             |     |
|------------|------------|-------------|------------|------------|-------------|-----|
| <400> 97   |            |             |            |            |             |     |
| atgaaaattt | taccgtttat | agcaagagga  | acaagttatt | acttgaagat | gtcagttaaa  | 60  |
| aagcttggtc | cttttttagt | agtaggattg  | atgctagcag | ctggtgatag | tgtctatgcc  | 120 |
| tattccagag | gaaatggatc | gattgcgcgt  | ggggatgatt | atcctgctta | ttataaaaat  | 180 |
| gggagccagg | agattgatca | gtggcgcatg  | tattctcgtc | agtgtacttc | ttttgtagcc  | 240 |
| tttcgtttga | gtaatgtcaa | tggttttgaa  | attccggcag | cttatggaaa | tgcgaaatgaa | 300 |
| tggggacatc | gtgctcgtcg | ggaagggttat | cgtgtagata | atacaccgac | gattgggttcc | 360 |
| attacttgg  | ctactgcagg | aacttatgg   | catgttgctc | gggtgtcaaa | tgtaatggga  | 420 |

## 1028462\_1.TXT

gatcagattg agattgagga atataactat ggttatacag aatcctataa taaacgagtt 480  
ataaaagcaa acacgatgac aggatttatt ctttttaaag atttggatgg tggcagtggt 540  
gggaatagtc aatcctcaac ttcaacaggc ggaactcatt attttaagac caagtctgct 600  
attaaaactg aacctctagc tagcggaact gtgattgatt actattatcc tggggagaag 660  
gttcattatg atcagatact tgaaaaagac ggctataagt gggtgagtta tactgcctat 720  
aatggaagct atcgttatgt tcaattggag gctgtgaata aaaatcctct aggtaattct 780  
gttcttttctt caacaggtgg aactcattat ttttaagacca agtctgctat caaaactgaa 840  
cccctagtta gtgcaactgt gattgattac tattatcctg gagagaagggt tcattatgat 900  
caaattctcg aaaaagacgg ctacaagtgg ttgagttata cggcttataa cggaagtcgt 960  
cgctatatac agctagaggg agtgacttct tcacaaaatt atcagaatca atcaggaaac 1020  
atctctagct atggatccca tagtagttca actgtcgggtt ggaagaaaat aaatggtagt 1080  
tggtatcatt tcaaataaaa tggttctaaa tcaacaggat ggctgaaaga cggttctagc 1140  
tggtattatt tgaaattatc tggtgaaatg cagacaggat gggttaaagga aaatggtttg 1200  
tggtattatc tgggtagttc aggggcaatg aaaacaggct ggtaccagggt ctctggtaag 1260  
tggtattatt cttactcttc aggcgcctta gctgttaata cgacgggtgga tggctacaga 1320  
gtaaacagtg atggagaacg agta 1344

<210> 98  
<211> 450  
<212> DNA  
<213> Streptococcus pneumoniae

<400> 98  
atgaaagtaa tcttttttagc agatgttaaa ggaaaaggta aaaaaggcga aattaaggaa 60  
gtaccaacag ggtatgcgca aaactttctt atcaaaaaga atctagccaa agaagcgact 120  
gctcaagctg taggtgaact tcgtggtaaa caaaaatcgg aagaaaaagc tcacgctgag 180  
atgattgcag aaggaaaagc aattaaagca caacttgaag cagaagaaac tgttgtagaa 240  
tttgttgaaa aagttgggtcc agatggctgt acctttgggt ctattaccaa taagaagatt 300  
gcagaagaat tgcaaaagca atttggaatt aagattgata aacgtcatat tcaagtacaa 360  
gctccgattc gagcggttgg tttgattgat gtgccagtga aaatctatca agatatcaca 420  
agtgtaatca atcttcgtgt gaaagaagga 450

<210> 99  
<211> 1176  
<212> DNA  
<213> Streptococcus pneumoniae

<400> 99  
atgaagaaaa aaatcttagc gtcactttta ttaagtacag taatggtttc tcaagtagct 60

## 1028462\_1.TXT

```

gttttaacaa ctgcgcatgc agaaacgact gatgacaaaa ttgctgctca agataataaa 120
attagtaact taacagcaca acaacaagaa gcccaaaaac aagttgacca aattcaggag 180
caagtatcag ctattcaagc tgagcagtct aacttgcaag ctgaaaatga tagattacaa 240
gcagaatcta agaaactcga gggtgagatt acagaacttt ctaaaaacat tgtttctcgt 300
aaccaatcgt tggaaaaaca agctcgtagt gctcaaacaa atggagccgt aactagctat 360
atcaatacca ttgtaaactc aaaatcaatt acagaagcta tttcacgtgt tgctgcaatg 420
agtgaaatcg tatctgcaaa caacaaaatg ttagaacaac aaaaggcaga taaaaaagct 480
atcttctgaaa aacaagtagc aaataatgat gctatcaata ctgtaattgc taatcaacaa 540
aaattggctg atgatgctca agcattgact acgaaacagg cagaactaaa agctgctgaa 600
ttaagtcttg ctgctgagaa agcgacagct gaaggggaaa aagcaagtct attagagcaa 660
aaagcagcag ctgaggcaga ggctcgtgca gctgcggtag cagaagcagc ttataaagaa 720
aaacgagcta gccacaaca atcagtactt gcttcagcaa acactaactt aacagctcaa 780
gtgcaagcag tatctgaatc tgcagcagca cctgtccgtg caaaagttcg tccaacatac 840
agtacaaacg cttcaagtta tccaattgga gaatgtacat ggggagtaaa aacattggca 900
ccttgggctg gagactactg gggtaatgga gcacagtggg ctacaagtgc agcagcagca 960
ggtttccgta caggttcaac acctcaagtt ggagcaattg catgttgga tgatggtgga 1020
tatggtcacg tagcggttgt tacagctggt gaatcaacaa cacgtatcca agtatcagaa 1080
tcaaattatg caggtaatcg tacaattgga aatcacctg gatgggttcaa tccaacaaca 1140
acttctgaag gttttgttac atatatttat gcagat 1176

```

```

<210> 100
<211> 387
<212> DNA
<213> Streptococcus pneumoniae

```

```

<400> 100
atggtaaaaa gacgtataag gagagggacg agagaacctg aaaaagttgt tgttcctgag 60
caatcatcta ttccttcgta tcctgtatct gttacatcta accaaggaac agatgtagca 120
gtagaaccag ctaaagcagt tgctccaaca acagactgga aacaagaaaa tggatatgtg 180
tatttttata atactgatgg ttccatggca acaggttggg tacaagttaa tagttcatgg 240
tactacctca acagcaacgg ttctatgaaa gtcaatcaat ggttccaagt tggtggtaaa 300
tggtattatg taaatacatc gggtgagtta gcggtcaata caagtataga tggctataga 360
gtcaatgata atggtgaatg ggtgcgt 387

```

```

<210> 101
<211> 138

```

1028462\_1.TXT

<212> DNA  
<213> Streptococcus pneumoniae

<400> 101  
gagttgcgac ggctatcaag gttggtggac caggagctct attttggatg tggatggcgg 60  
ctttcttttg aatggctacc aagtatgcgg aaggactctt ggccatcaaa taccgcacca 120  
aggacgacca tgggtgcag 138

<210> 102  
<211> 93  
<212> DNA  
<213> Streptococcus pneumoniae

<400> 102  
gactgtatca ggaacaacc gttcacacgc gatgaaccaa aaaaaacgtg ccgtaaaacc 60  
aaaccttcaa aaagttactg ttcttatcga tgg 93

<210> 103  
<211> 78  
<212> DNA  
<213> Streptococcus pneumoniae

<400> 103  
ggacaaagaa accctcgaag aattgaaaga gttatcagaa tggcagaaac gaaaccaaga 60  
atatctaaaa aagaaggc 78

<210> 104  
<211> 249  
<212> DNA  
<213> Streptococcus pneumoniae

<400> 104  
cagaggaagc tgttcaaaat cttccaccta ttccagaaga aaagtgggtg gaaccagaaa 60  
tcattcctgcc tcaagctgaa cttaaattcc ctgaacagga agatgactca gatgacgaag 120  
atgttcaggt cgatttttca gccaaagaag cccttgaata caaacttcca agcttacaac 180  
tctttgcacc agataaacca aaagatcagt cttaaagagaa gaaaattgtc agagaaaata 240  
tcaaaatct 249

<210> 105  
<211> 312  
<212> DNA  
<213> Streptococcus pneumoniae

<400> 105  
ttggtgatta tagttttgaa aatccagtc aaatcggaga cagactttat tttcaagaca 60  
tggccattta ttcttttgtc aaaaataata cctttaatgg tattggattg ccaagtctct 120  
atctcatgga cgaacaggga gactgtagct tactcaaagc ttttggctat caagacttta 180  
aagggagatt atcatgatgg acagtccaaa aaaattaggc tatcacatgc cagcagagta 240

## 1028462\_1.TXT

cgaaccccat catggtaccc tcatgatatg gccgactcga ccaggatcat ggccttttca 300  
aggaaaggct gc 312

<210> 106  
<211> 90  
<212> DNA  
<213> Streptococcus pneumoniae

<400> 106  
gagagactac cagcttttcc tagaagtctt tcagggagga agttggacca aggcggaacc 60  
aaagaaaaag gctcggatgg aagaagtcct 90

<210> 107  
<211> 912  
<212> DNA  
<213> Streptococcus pneumoniae

<400> 107  
agaaattgcc tctctacttg gaaaagctcc tcaaactatc aactgaaat caagcgtggg 60  
acagtccgac aatgtcttgg aaaagggcgc ttcaaagagg ttatttctgc cgactacgct 120  
caacagtctt atgaaaacaa tcgcaagcgc tcggtcaaga aatcaagctt gaccaaggaa 180  
ctaaaggaaa agattctcca ctatcataac caaaaatttt cgcctgaaat gatggttatg 240  
gctaaagggg ttaacgtggg aatttcaacc atttactatt ggattcatca tggaaaattg 300  
gggttaagca agcaggattt gctttaccct agaaaaggaa aagcgcttaa gaaacaggct 360  
agcaccaact ttaaacctgc tgggtcaatcc atcgaacagc ggcctgaagc tatcaatctt 420  
cgcttgagga atgggcatta tgagattgat acggttctac ttacgagatc gaaaaactac 480  
tgcttgattg tcttgacgga tcgaaagagt agacatcaga tcatccgatt gattccaaat 540  
aaaagtgctg aggtgggtcaa tcaggctcta aaactcatct taaaacaaca caagattctt 600  
tccatcacgg cagataatgg aacggaattc aatcgcttgt ttgatataatt ttctgaggag 660  
cacatctatt atgcgcaccc ctatgcctct tgggaaaggg gaactaatga gaatcacaaac 720  
aggctcattc gtagatagtt acctaaggga accaagaaaa tgactcccaa agaagtcgca 780  
ttcatcgaaa agtggattaa caactatcct aaaaaatgct tggactacaa gtcaccaga 840  
gaagacttct ggatggctaa cttgaacttg aaatttagca aaatggaaat aatttttatt 900  
aaacgcttcc aa 912

<210> 108  
<211> 108  
<212> DNA  
<213> Streptococcus pneumoniae

<400> 108  
cctgtcatga ctatctcatc gcctactatg aaaaacatgg atttgtcaac gaaggccagt 60



## 1028462\_1.TXT

cccagtcaac ctttgcaggg gaaacatggt atgatatggt ctgggaaa 108

<210> 109  
 <211> 84  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 109  
 acatcatcaa taaggatata cacaaggaaa tcatcgccaa actggactac gacgccccat 60  
 cttgccctga gtgcggaaac caat 84

<210> 110  
 <211> 81  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 110  
 tacttccttc cacacaagta tgccagagaa agcttatcgc taccctctac caacaaaata 60  
 ttacacagaa aacaaggttc g 81

<210> 111  
 <211> 159  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 111  
 gcagccttca aaaaagatca aattaatgag cgtgtcgaga aattaggtaa gttaaacct 60  
 attacaataa attacaacgg aaaatcagaa gtaattgata gtaaagaaaa attacaagag 120  
 cttatgaata aagccgttaa agacgaagtg gctcaaata 159

<210> 112  
 <211> 99  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 112  
 gcttatcgc attctaaaag aagcgctgga agtggcaggg caggaggcag acaatgtctt 60  
 tgccaatgtc aaaataaatg taggagagat ttttaagtat 99

<210> 113  
 <211> 108  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 113  
 cacggccgac cttatcataa gcctcaccaa ccgcatcatc acgggtttcc ccaacaatct 60  
 tataatctcc tgcctccgaa acataaacca actctgtgtg tccgccgc 108

<210> 114  
 <211> 390

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 114

```

aaaggaaaaa tcctcctgct accaaggcta accactcaaa gatggcaaag aaaaatccgc      60
cctgactcac gtaagtcagc aaataataaa gcaaacccttg acttccataa tagtcgctgt      120
aaatcttccc tgtctgatga agcgcccaac ctgcataaaa atcctgcact tcttgtgcac      180
tcattaagtc gagtaatagc ggtactccta gagttatccc cgttacaagc gtactccata      240
gtaaaatttt caccaaagga agacgacttg attcacgatg atgcgattct tgttcgattt      300
ggatttctag aggttcacga ttctccttat gaacttcttc tactctacca tacacactca      360
tatcgtttct cctgttcaat ttatctgtct      390

```

&lt;210&gt; 115

&lt;211&gt; 432

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 115

```

tttacggtaa gccatgtatt cctcctttat ttatctttta atccaagacc caaatcaatg      60
agtttgagtt tcacttcttc caaactcttg cgtccaagat ttcgtacttt catcatctct      120
gcttcagatt tttctgtcaa atcatgcaca gtattgatac cggcacgttt taaacagttg      180
tatgaacgca cagacaagtc cagttcctca atcgtacgat ctaaaatacg gtcgtcagat      240
tcagtatcag cttctttcat cacttcagtt gacttagcaa tctcagtaag atttgtaaac      300
aaatcaagat gttctgtcaa aatacgtgct gaaagcccta aagcatcttc tggaataatt      360
gttccatttg tcaagatttc aagggttaat ttgtcgaaac catcattgct acctacacga      420
gcaggttcca ct      432

```

&lt;210&gt; 116

&lt;211&gt; 54

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 116

```

cttgtctgca tgaagaataa gggctgctac aaggaaagaa acaactgctg ccac      54

```

&lt;210&gt; 117

&lt;211&gt; 174

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 117

```

ttccattatt tgtcaaaata ctttttagtt tcagcaataa cgactggcga caagaccaag      60
agggcaatca agtttggcag agccatcaag gcgttaacga tatctgcatg aatccagacc      120
atatccaact cgataaatcc tcctaacaag accatgagca caaaaaccac acgg      174

```

## 1028462\_1.TXT

<210> 118  
 <211> 141  
 <212> DNA  
 <213> Streptococcus pneumoniae  
  
 <400> 118  
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 attacaggca ggacaaaaga taagatagtc gataaaaagg ttggttgtcc atttgaaaaa 120  
 agcacggtaa aatactcatc a 141  
  
 <210> 119  
 <211> 111  
 <212> DNA  
 <213> Streptococcus pneumoniae  
  
 <400> 119  
 tcttcaccag tttttcctaa acttgtaatg gtatctgggg caaataaacc aagagaaagg 60  
 cgcaatttcc cattttcgtc taaaatgtca ttccacttaa cttttgtctt g 111  
  
 <210> 120  
 <211> 231  
 <212> DNA  
 <213> Streptococcus pneumoniae  
  
 <400> 120  
 tacttaactt ctttctcagt tccgaagata gcttcttcaa aggtcaaatt gacacgatac 60  
 tggagatcat ctccttggcg aggagcgttt ggattgcgcy aagaaccgcc tccgccgaag 120  
 aaacttgaga aaatatcctc aaaaccaccg aagccacctg cccattgaa accgccgaaa 180  
 ccaccagctc caccaaaacc accattggcg cctgcagcac catactggtc a 231  
  
 <210> 121  
 <211> 267  
 <212> DNA  
 <213> Streptococcus pneumoniae  
  
 <400> 121  
 cagtcatggc gtcctattcc agattcaaaa tgctatacac aagaaaaact cactatcccc 60  
 attaaaagaa gaaaagacat caaggacttc taccacaatt ccatccaaag acacaaaaac 120  
 agccataaga gtcacctcct tgattcctat aggctgatta taacaagact ggctgaaatt 180  
 gtacatgaaa ataaaatcct aatagtactc attttgtatg tgactaatat tccgtctcgc 240  
 tccagaaggt acgaagtaaa tagagtt 267  
  
 <210> 122  
 <211> 180  
 <212> DNA  
 <213> Streptococcus pneumoniae  
  
 <400> 122

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ctgttttcgtt tttatcgtgt aattgttctt tatcgagggtt ggcataattta tctttttaatt 60  
 cttgtgaatt tgcagtacgt tcaaaacgtt ttccgaaagg atcgattcct tgttcgcgga 120  
 gcgcagccat tttttcacgg cgaacgatct gctgggtcatt tagttcttcc atatgttctg 180

<210> 123  
 <211> 180  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 123  
 ataactcacc ctccactaaa ccctgagcat tttgtttcaa gagtcttttc atctcttggt 60  
 ttgaagtctt atcagccaaa agatgataga tttctgagaa agccttcaga tagtaggcat 120  
 cctgaatcag gtaatagcgg aaaatggcag gttctaaatt cccctcttgt aattgtaaaa 180

<210> 124  
 <211> 90  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 124  
 acattggcta aagcagtcgg tttgatgtat tctccaccaa ttccaccaa accattctta 60  
 ggccgaataa cgacagattc gtcttctata 90

<210> 125  
 <211> 249  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 125  
 cctggttctc cattttcaga gatttccggt gcaggatttt ttggtgtcgc gaaacgaata 60  
 tttccacgtc caccacgacc accgtgggca acgataaatt cttgcccattg ttcaatcaaa 120  
 tctgttaaaa ccttgccagt ctccgcatca cgaacagtcg taccttgtgg tactcgaact 180  
 ctaaggctct cagcaccacg accatgcatt cctttgggtca tccctttttc accagaatca 240  
 gccttgaaa 249

<210> 126  
 <211> 333  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 126  
 ataaattcct tgaccttggc cacatcctta tccaaaagaa gggcaccaag aaaggcttca 60  
 aaggcatcac caagaatggt gtcacgattg cgaccacctg atttttcttc ccctttaccc 120  
 aacttgataa actggtcaaa ctggcaatca gcgcgaaaac cagctaaact ctccctcacgg 180  
 acaatcatag cacggagttt tgataggtca ccttcaggct ttttaggata ttttttatat 240  
 agatattctg aaatcaataa ctgtagaaca gcgtctccta aaaattccaa gcgttcattg 300

tgtgaaatTT ttaagaggcg gtgctcattg gca 333

<210> 127  
 <211> 147  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 127  
 ccaataggaa aaaggaattg taaagctgaa tgccaatccc accacctgct tgaaaagcag 60  
 aagaccttcc agtcaagaaa gaccaagaga tatggggcaa gccccgaacc aagatataga 120  
 gaatcaagga agccaagatt gtcacaa 147

<210> 128  
 <211> 174  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 128  
 cagccattgg gacactcgaa agccgaagaa catgagacta tctgttcgca taccttcgat 60  
 aaccatacga ccgaaaccat accaaatcaa gtaaaaggcc gtgatatgac ctcgtctgag 120  
 actctttccat ttccgtctaa aaatcagaat caaggcaaag ccaagcagat tcca 174

<210> 129  
 <211> 375  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 129  
 ccttgctctt tacctgatta tgggctgggtt ggttctggct atcattcctg ccattatcag 60  
 tcaaacgaca cccgttttct ggagtctcat ggtaactggc ggactctgtt atacagttgg 120  
 agctggattt tatgccaaga aaaaacctta tttccacatg atttggcatc tctttatcct 180  
 agctgcgtcc gcacttcaat acatcgctat tgtttattac atgtaaaaaa gttgagaaat 240  
 tcaatctcaa cttttttctt tacacatatt gataaagtac tggtgcaagc gcacatcatc 300  
 agtcaattct ggatgaaaag aacttaccaa catatTTTTT tcttgggctg caacaatttg 360  
 attgttcact gttgc 375

<210> 130  
 <211> 207  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 130  
 cgagtaaaag ataatcatct ggataagctt gtgaaagctc ttctaaaaag gcgttcattc 60  
 actcagtatt acatccacca gctattaaga aaaatgattc gcctgtatgg gcatcaacag 120  
 ctccataaca atagcgaaat tctcgatat agtgactatg gacatgtgga cctactccta 180

ttggagacca acaagatccc agttttac 207

<210> 131  
 <211> 120  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 131  
 caagtcacat aaatagacat agcaactaca aataaaacgg aatctgtaaa gagccaaagt 60  
 gagagagaaa agaaaagatt gacaagcagt aatatactaa aggttagagg gcgaccgata 120

<210> 132  
 <211> 96  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 132  
 gcctttaaga gttccaaggt cccatcactt gatccatcat cgacaaagac atactcgatt 60  
 tctgtttcca aatctggaag taaagcttcc agagcc 96

<210> 133  
 <211> 207  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 133  
 gataaaactg acccactggc taggaaactt cctgacaaaa gtaagccgtc aacttccttt 60  
 tgcaccaaact cactttctcc cggttaacatg gcttcattga cttccgcaaa gccttcacaa 120  
 accaaggcat cactaggaat ctgctctcct gcagacaaac gaatgacatc tcctagcact 180  
 aattcttcag gattaagagc aacttcc 207

<210> 134  
 <211> 114  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 134  
 ttatgccgat taaaaacaca agcaaggcca cgaggggtctg tgaccaatct aacgaagcaa 60  
 aataaggtat atagatacct aaattatctc cgccagacgc aattgtcagc aatg 114

<210> 135  
 <211> 330  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 135  
 tgcattcaaa gcattggcaa tgagggacag tgcaaaggca atagttgtta cgtaggcaag 60  
 gagattcatc ttgccccat atccgatata gttggtcaca aaggcaaaga ggaaggcgat 120  
 gatggaaatg atgatggccg ccaattttac ctgtttttgg ctcatgttgt tgggtctgcc 180

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|  |     |
|--|-----|
| ttctttgcgaa gcttcccact tctttatagc aaaggtataa atgaggaagg tgacgggata | 240 |
| ggtaatgatg gccgccttat ttccaaggat ataatcaata gcaccggaca aaatggtatt  | 300 |
| aacaatacca aagtaatttc cccatttgct                                   | 330 |

<210> 136  
 <211> 363  
 <212> DNA  
 <213> Streptococcus pneumoniae

|   |     |
|---|-----|
| <400> 136<br>acgtccacga agctgggttat cgatacgacg actttcatga cgttctgtac caataacaca | 60  |
| aagtcctcca agttcacgaa caccttcacc aagcttgatg tcggtaccac gacccgccat               | 120 |
| gttggttgcg atggtaacgg caccacgttg accagcattc atgatgattt gggcttctct               | 180 |
| atagtggttt ttggcattca agacttcgtg aggaacacca gctgcaacca atttcttaga               | 240 |
| aatgtagtca ctagtttcaa ccgctactgt accaaccaag acaggttgac ccttttggtg               | 300 |
| acgagcctta acgtcttcga caaccgcttt aaacttagat tcgatacttg cataaagaag               | 360 |
| gtc   | 363 |

<210> 137  
 <211> 81  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |    |
|--|----|
| <400> 137<br>atctctactg gtgtaccgac ctgttcgatg tatccattgt taaagactgc aattctatca | 60 |
| gataaagtca aggcttcctc t  | 81 |

<210> 138  
 <211> 102  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |     |
|--|-----|
| <400> 138<br>ttaagtacca tgtccagcat aaagtcaatc ttgtgctctt taccgacaca caccattttc | 60  |
| tcaaaatcag ccatatcacc aaaaagagga tccactgccca ta                                | 102 |

<210> 139  
 <211> 333  
 <212> DNA  
 <213> Streptococcus pneumoniae

|  |     |
|--|-----|
| <400> 139<br>agctgctcat actcatctac caactccaag gcatgctcaa tcgtcggttt atcaaaacca | 60  |
| acaatattca tctgtgtcac acccatctca gcagccaagg caatttcttc tgcctcacga              | 120 |
| cctgcaaatt cttctacatt caagtgtgta tgtgtatcaa aaatcatctc ttctaacctc              | 180 |
| gttttctatc ttctattata ccaaaaaaga ggagggggcac ctaatttttc ggtttcccct             | 240 |

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cctctcttca atagagagct attctgctat cttttctatc cgatattgcc catctcctat 300  
 tccacagtta gagacagaag agattggcta cat 333

<210> 140  
 <211> 330  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 140  
 gtaacatctt gcattgttcc tgcagttgct tgcggtgcac ttgttgtctt aggagcagca 60  
 ttaggagcca ctggtctctt aggaactgta accatggcaa tggcttgcac tccaatcgtt 120  
 tctgcttcct tcacatcttc catagttttc gcattttcaa tctctttgag agctgcttgt 180  
 ttttctgctt ccactcttgc taaaagttct gctttttctt tatcagaaag cgggtgcgcct 240  
 ttgatttcat cctgcttgtc cttggctgct ttttcaatgg catttttagc tgattctttt 300  
 tcagtagcta attgcttaga agcttgtgat 330

<210> 141  
 <211> 159  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 141  
 tattctcctt tcaaccactc cattctcata aggaaaacga cgaaaatcat aaatccaaac 60  
 cccaaagcac cacgaatgaa ttggcgaagc aagggttggc caaaccaacc tgtaaacatt 120  
 tccactaacc ataccaagag tgacaggccg ataaagaaa 159

<210> 142  
 <211> 144  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 142  
 gattatttca agtttcgaac aactttttaca agattttcta cagtaaagcc atattctgcc 60  
 aatacttttg gtgctggggc agaggctccg aaggatatcaa tacctagaac ggcaccatcg 120  
 agaccaacat atttgtacca gttt 144

<210> 143  
 <211> 222  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 143  
 agaggcagac gtggattatg cgttgcacga atcaaggctc ctagactagt cattaaacct 60  
 aagagaacaa tcgatccgcc taccaaagat agatacagtc caccactctc agctacatcc 120  
 ctctccgtcc ccaaagtc tcatctctt ttcccagcga agatggacaa aaatcctaaa 180



aggaaactta atagtaaggt aatcttcaac gcctcagtca ca 222

<210> 144  
 <211> 90  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 144  
 actcctccat ataccaaaat tcctgcaaaa acagctataa taccatttat ttcagctcaa 60  
 gatttcaacc aagcccaacg gctctctgga 90

<210> 145  
 <211> 122  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 145  
 Met Ser Lys Asn Ile Val Gln Leu Asn Asn Ser Phe Ile Gln Asn Glu  
 1 5 10 15  
 Tyr Gln Arg Arg Arg Tyr Leu Met Lys Glu Arg Gln Lys Arg Asn Arg  
 20 25 30  
 Phe Met Gly Gly Val Leu Ile Leu Ile Met Leu Leu Phe Ile Leu Pro  
 35 40 45  
 Thr Phe Asn Leu Ala Gln Ser Tyr Gln Gln Leu Leu Gln Arg Arg Gln  
 50 55 60  
 Gln Leu Ala Asp Leu Gln Thr Gln Tyr Gln Thr Leu Ser Asp Glu Lys  
 65 70 75 80  
 Asp Lys Glu Thr Ala Phe Ala Thr Lys Leu Lys Asp Glu Asp Tyr Ala  
 85 90 95  
 Ala Lys Tyr Thr Arg Ala Lys Tyr Tyr Tyr Ser Lys Ser Arg Glu Lys  
 100 105 110  
 Val Tyr Thr Ile Pro Asp Leu Leu Gln Arg  
 115 120

<210> 146  
 <211> 877  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 146  
 Met Asp Lys Lys Lys Leu Leu Leu Ile Asp Gly Ser Ser Val Ala Phe  
 1 5 10 15

## 1028462\_1.TXT

Arg Ala Phe Phe Ala Leu Tyr Gln Gln Leu Asp Arg Phe Lys Asn Val  
 20 25 30  
 Ala Gly Leu His Thr Asn Ala Ile Tyr Gly Phe Gln Leu Met Leu Ser  
 35 40 45  
 His Leu Leu Glu Arg Val Glu Pro Ser His Ile Leu Val Ala Phe Asp  
 50 55 60  
 Ala Gly Lys Thr Thr Phe Arg Thr Glu Met Tyr Ala Asp Tyr Lys Gly  
 65 70 75 80  
 Gly Arg Ala Lys Thr Pro Asp Glu Phe Arg Glu Gln Phe Pro Phe Ile  
 85 90 95  
 Arg Glu Leu Leu Asp His Met Gly Ile Arg His Tyr Asp Leu Ala Gln  
 100 105 110  
 Tyr Glu Ala Asp Asp Ile Ile Gly Thr Leu Asp Lys Leu Ala Glu Gln  
 115 120 125  
 Asp Gly Phe Asp Ile Thr Ile Val Ser Gly Asp Lys Asp Leu Ile Gln  
 130 135 140  
 Leu Thr Asp Glu His Thr Val Val Glu Ile Ser Lys Lys Gly Val Ala  
 145 150 155 160  
 Glu Phe Glu Ala Phe Thr Pro Asp Tyr Leu Met Glu Glu Met Gly Leu  
 165 170 175  
 Thr Pro Ala Gln Phe Ile Asp Leu Lys Ala Leu Met Gly Asp Lys Ser  
 180 185 190  
 Asp Asn Ile Pro Gly Val Thr Lys Val Gly Glu Lys Thr Gly Ile Lys  
 195 200 205  
 Leu Leu Leu Glu His Gly Ser Leu Glu Gly Ile Tyr Glu Asn Ile Asp  
 210 215 220  
 Gly Met Lys Thr Ser Lys Met Lys Glu Asn Leu Ile Asn Asp Lys Glu  
 225 230 235 240  
 Gln Ala Phe Leu Ser Lys Thr Leu Ala Thr Ile Asp Thr Lys Ala Pro  
 245 250 255  
 Ile Ala Ile Gly Leu Glu Asp Leu Val Tyr Ser Gly Pro Asp Val Glu  
 260 265 270

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Asn Leu Gly Lys Phe Tyr Asp Glu Met Gly Phe Lys Gln Leu Lys Gln  
 275 280 285  
 Ala Leu Asn Val Ser Ser Ala Asp Val Ser Glu Ser Leu Asp Phe Thr  
 290 295 300  
 Ile Val Asp Gln Ile Ser Gln Asp Met Leu Ser Glu Glu Ser Ile Phe  
 305 310 315 320  
 His Phe Glu Leu Phe Gly Glu Asn Tyr His Thr Asp Asn Leu Val Gly  
 325 330 335  
 Phe Val Trp Ser Cys Gly Asp Lys Leu Tyr Ala Thr Asp Lys Leu Glu  
 340 345 350  
 Leu Leu Gln Asp Pro Ile Phe Lys Asp Phe Leu Glu Lys Thr Ser Leu  
 355 360 365  
 Arg Val Tyr Asp Phe Lys Lys Val Lys Val Leu Leu Gln Arg Phe Gly  
 370 375 380  
 Val Asp Leu Gln Ala Pro Ala Phe Asp Ile Arg Leu Ala Lys Tyr Leu  
 385 390 395 400  
 Leu Ser Thr Val Glu Asp Asn Glu Ile Ala Thr Ile Ala Ser Leu Tyr  
 405 410 415  
 Gly Gln Thr Tyr Leu Val Asp Asp Glu Thr Phe Tyr Gly Lys Gly Val  
 420 425 430  
 Lys Lys Ala Ile Pro Glu Arg Glu Lys Phe Leu Glu His Leu Ala Cys  
 435 440 445  
 Lys Leu Ala Val Leu Val Glu Thr Glu Pro Ile Leu Leu Glu Lys Leu  
 450 455 460  
 Ser Glu Asn Gly Gln Leu Glu Leu Leu Tyr Asp Met Glu Gln Pro Leu  
 465 470 475 480  
 Ala Phe Val Leu Ala Lys Met Glu Ile Ala Gly Ile Met Val Lys Lys  
 485 490 495  
 Glu Thr Leu Leu Glu Met Gln Ala Glu Asn Glu Leu Val Ile Glu Lys  
 500 505 510  
 Leu Thr Gln Glu Ile Tyr Glu Leu Ala Gly Glu Glu Phe Asn Val Asn

|            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Ser        | Pro<br>530 | Lys        | Gln        | Leu        | Gly        | Val<br>535 | Leu        | Leu        | Phe        | Glu        | Lys<br>540 | Leu        | Gly        | Leu        | Pro        |
| Leu<br>545 | Glu        | Tyr        | Thr        | Lys        | Lys<br>550 | Thr        | Lys        | Thr        | Gly        | Tyr<br>555 | Ser        | Thr        | Ala        | Val        | Asp<br>560 |
| Val        | Leu        | Glu        | Arg        | Leu<br>565 | Ala        | Pro        | Ile        | Ala        | Pro<br>570 | Ile        | Val        | Lys        | Lys        | Ile<br>575 | Leu        |
| Asp        | Tyr        | Arg        | Gln<br>580 | Ile        | Ala        | Lys        | Ile        | Gln<br>585 | Ser        | Thr        | Tyr        | Val        | Ile<br>590 | Gly        | Leu        |
| Gln        | Asp        | Trp<br>595 | Ile        | Leu        | Ala        | Asp        | Gly<br>600 | Lys        | Ile        | His        | Thr        | Arg<br>605 | Tyr        | Val        | Gln        |
| Asp        | Leu<br>610 | Thr        | Gln        | Thr        | Gly        | Arg<br>615 | Leu        | Ser        | Ser        | Val        | Asp<br>620 | Pro        | Asn        | Leu        | Gln        |
| Asn<br>625 | Ile        | Pro        | Ala        | Arg        | Leu<br>630 | Glu        | Gln        | Gly        | Arg        | Leu<br>635 | Ile        | Arg        | Lys        | Ala        | Phe<br>640 |
| Val        | Pro        | Glu        | Trp        | Glu<br>645 | Asp        | Ser        | Val        | Leu        | Leu<br>650 | Ser        | Ser        | Asp        | Tyr        | Ser<br>655 | Gln        |
| Ile        | Glu        | Leu        | Arg<br>660 | Val        | Leu        | Ala        | His        | Ile<br>665 | Ser        | Lys        | Asp        | Glu        | His<br>670 | Leu        | Ile        |
| Lys        | Ala        | Phe<br>675 | Gln        | Glu        | Gly        | Ala        | Asp<br>680 | Ile        | His        | Thr        | Ser        | Thr<br>685 | Ala        | Met        | Arg        |
| Val        | Phe<br>690 | Gly        | Ile        | Glu        | Arg        | Pro<br>695 | Asp        | Asp        | Val        | Thr        | Ala<br>700 | Asn        | Asp        | Arg        | Arg        |
| Asn<br>705 | Ala        | Lys        | Ala        | Val        | Asn<br>710 | Phe        | Gly        | Val        | Val        | Tyr<br>715 | Gly        | Ile        | Ser        | Asp        | Phe<br>720 |
| Gly        | Leu        | Ser        | Asn        | Asn<br>725 | Leu        | Gly        | Ile        | Ser        | Arg<br>730 | Lys        | Glu        | Ala        | Lys        | Ala<br>735 | Tyr        |
| Ile        | Asp        | Thr        | Tyr<br>740 | Phe        | Glu        | Arg        | Phe        | Pro<br>745 | Gly        | Ile        | Lys        | Asn        | Tyr<br>750 | Met        | Asp        |
| Glu        | Val        | Val<br>755 | Arg        | Glu        | Ala        | Arg        | Asp<br>760 | Lys        | Gly        | Tyr        | Val        | Glu<br>765 | Thr        | Leu        | Phe        |

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Lys Arg Arg Arg Glu Leu Pro Asp Ile Asn Ser Arg Asn Phe Asn Ile  
 770 775 780

Arg Gly Phe Ala Glu Arg Thr Ala Ile Asn Ser Pro Ile Gln Gly Ser  
 785 790 795 800

Ala Ala Asp Ile Leu Lys Ile Ala Met Ile Gln Leu Asp Lys Ala Leu  
 805 810 815

Val Ala Gly Gly Tyr Gln Thr Lys Met Leu Leu Gln Val His Asp Glu  
 820 825 830

Ile Val Leu Glu Val Pro Lys Ser Glu Leu Val Glu Met Lys Lys Leu  
 835 840 845

Val Lys Gln Thr Met Glu Glu Ala Ile Gln Leu Ser Val Pro Leu Ile  
 850 855 860

Ala Asp Glu Asn Glu Gly Ala Thr Trp Tyr Glu Ala Lys  
 865 870 875

<210> 147  
 <211> 211  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 147

Met Gly Met Ala Ala Phe Lys Asn Pro Asn Asn Gln Tyr Lys Ala Ile  
 1 5 10 15

Thr Ile Ala Gln Thr Leu Gly Asp Asp Ala Ser Ser Glu Glu Leu Ala  
 20 25 30

Gly Arg Tyr Gly Ser Ala Val Gln Cys Thr Glu Val Thr Ala Ser Asn  
 35 40 45

Leu Ser Thr Val Lys Thr Lys Ala Thr Val Val Glu Lys Pro Leu Lys  
 50 55 60

Asp Phe Arg Ala Ser Thr Ser Asp Gln Ser Gly Trp Val Glu Ser Asn  
 65 70 75 80

Gly Lys Trp Tyr Phe Tyr Glu Ser Gly Asp Val Lys Thr Gly Trp Val  
 85 90 95

Lys Thr Asp Gly Lys Trp Tyr Tyr Leu Asn Asp Leu Gly Val Met Gln  
 100 105 110

Thr Gly Phe Val Lys Phe Ser Gly Ser Trp Tyr Tyr Leu Ser Asn Ser  
 115 120 125

Gly Ala Met Phe Thr Gly Trp Gly Thr Asp Gly Ser Arg Trp Phe Tyr  
 130 135 140

Phe Asp Gly Ser Gly Ala Met Lys Thr Gly Trp Tyr Lys Glu Asn Gly  
 145 150 155 160

Thr Trp Tyr Tyr Leu Asp Glu Ala Gly Ile Met Lys Thr Gly Trp Phe  
 165 170 175

Lys Val Gly Pro His Trp Tyr Tyr Ala Tyr Gly Ser Gly Ala Leu Ala  
 180 185 190

Val Ser Thr Thr Thr Pro Asp Gly Tyr Arg Val Asn Gly Asn Gly Glu  
 195 200 205

Trp Val Asn  
 210

<210> 148  
 <211> 1856  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 148

Met Ser Arg Lys Ser Ile Gly Glu Lys Arg His Ser Phe Ser Met Arg  
 1 5 10 15

Lys Leu Ser Val Gly Leu Val Ser Val Thr Val Ser Ser Phe Phe Leu  
 20 25 30

Met Ser Gln Gly Ile Gln Ser Val Ser Ala Asp Asn Met Glu Ser Pro  
 35 40 45

Ile His Tyr Lys Tyr Met Thr Glu Gly Lys Leu Thr Asp Glu Glu Lys  
 50 55 60

Ser Leu Leu Val Glu Ala Leu Pro Gln Leu Ala Glu Glu Ser Asp Asp  
 65 70 75 80

Thr Tyr Tyr Leu Val Tyr Arg Ser Gln Gln Phe Leu Pro Asn Thr Gly  
 85 90 95

Phe Asn Pro Thr Val Gly Thr Phe Leu Phe Thr Ala Gly Leu Ser Leu  
 100 105 110

## 1028462\_1.TXT

Leu Val Leu Val Ser Lys Arg Glu Asn Gly Lys Lys Arg Leu Val  
 115 120 125  
 His Phe Leu Leu Leu Thr Ser Met Gly Val Gln Leu Leu Pro Ala Ser  
 130 135 140  
 Ala Phe Gly Leu Thr Ser Gln Ile Leu Ser Ala Tyr Asn Ser Gln Leu  
 145 150 155 160  
 Ser Ile Gly Val Gly Glu His Leu Pro Glu Pro Leu Lys Ile Glu Gly  
 165 170 175  
 Tyr Gln Tyr Ile Gly Tyr Ile Lys Thr Lys Lys Gln Asp Asn Thr Glu  
 180 185 190  
 Leu Ser Arg Thr Val Asp Gly Lys Tyr Ser Ala Gln Arg Asp Ser Gln  
 195 200 205  
 Pro Asn Ser Thr Lys Thr Ser Asp Val Val His Ser Ala Asp Leu Glu  
 210 215 220  
 Trp Asn Gln Gly Gln Gly Lys Val Ser Leu Gln Gly Glu Ala Ser Gly  
 225 230 235 240  
 Asp Asp Gly Leu Ser Glu Lys Ser Ser Ile Ala Ala Asp Asn Leu Ser  
 245 250 255  
 Ser Asn Asp Ser Phe Ala Ser Gln Val Glu Gln Asn Pro Asp His Lys  
 260 265 270  
 Gly Glu Ser Val Val Arg Pro Thr Val Pro Glu Gln Gly Asn Pro Val  
 275 280 285  
 Ser Ala Thr Thr Val Gln Ser Ala Glu Glu Glu Val Leu Ala Thr Thr  
 290 295 300  
 Asn Asp Arg Pro Glu Tyr Lys Leu Pro Leu Glu Thr Lys Gly Thr Gln  
 305 310 315 320  
 Glu Pro Gly His Glu Gly Glu Ala Ala Val Arg Glu Asp Leu Pro Val  
 325 330 335  
 Tyr Thr Lys Pro Leu Glu Thr Lys Gly Thr Gln Gly Pro Gly His Glu  
 340 345 350  
 Gly Glu Ala Ala Val Arg Glu Glu Glu Pro Ala Tyr Thr Glu Pro Leu  
 355 360 365

## 1028462\_1.TXT

Ala Thr Lys Gly Thr Gln Glu Pro Gly His Glu Gly Lys Ala Thr Val  
 370 375 380  
 Arg Glu Glu Thr Leu Glu Tyr Thr Glu Pro Val Ala Thr Lys Gly Thr  
 385 390 395 400  
 Gln Glu Pro Glu His Glu Gly Glu Ala Ala Val Glu Glu Glu Leu Pro  
 405 410 415  
 Ala Leu Glu Val Thr Thr Arg Asn Arg Thr Glu Ile Gln Asn Ile Pro  
 420 425 430  
 Tyr Thr Thr Glu Glu Ile Gln Asp Pro Thr Leu Leu Lys Asn Arg Arg  
 435 440 445  
 Lys Ile Glu Arg Gln Gly Gln Ala Gly Thr Arg Thr Ile Gln Tyr Glu  
 450 455 460  
 Asp Tyr Ile Val Asn Gly Asn Val Val Glu Thr Lys Glu Val Ser Arg  
 465 470 475 480  
 Thr Glu Val Ala Pro Val Asn Glu Val Val Lys Val Gly Thr Leu Val  
 485 490 495  
 Lys Val Lys Pro Thr Val Glu Ile Thr Asn Leu Thr Lys Val Glu Asn  
 500 505 510  
 Lys Lys Ser Ile Thr Val Ser Tyr Asn Leu Ile Asp Thr Thr Ser Ala  
 515 520 525  
 Tyr Val Ser Ala Lys Thr Gln Val Phe His Gly Asp Lys Leu Val Lys  
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Ala Glu Gln Pro Gly Val Tyr Thr Ser Phe Lys Gln Leu Val Thr Ala  
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Ala Phe Thr Gly Ser Leu Ile Gly Ser Asp Gly Thr Lys Ser Tyr Ala  
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Val Gly Asn Ile Thr Gly Asn Ser Ser Arg Val Asn Lys Val Arg Val  
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Asp Ala Leu Ile Ser Thr Asn Ala Arg Asn Asn Asn Gln Thr Ala Gly  
Page 125

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 Tyr Leu Asp Val Thr Phe Lys Glu Asn Phe Ile Asn Ser Gln Val  
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| Ala | Phe  | Val | Ser | Asp | Tyr | Thr  | Ala | Ile | Thr | Asn | Asn  | Val | Leu | Ser |
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| Asp | Leu  | Gln | Asn | Val | Thr | Leu  | Asn | Ser | Glu | Ala | Thr  | Lys | Lys | Val |
|     | 1130 |     |     |     |     | 1135 |     |     |     |     | 1140 |     |     |     |
| Leu | Gly  | Ala | Ala | Asn | Asp | Ala  | Ala | Leu | Asp | Asn | Leu  | Tyr | Leu | Asp |
|     | 1145 |     |     |     |     | 1150 |     |     |     |     | 1155 |     |     |     |
| Arg | Gln  | Phe | Glu | Glu | Val | Lys  | Ala | Asn | Ile | Ala | Glu  | His | Leu | Arg |
|     | 1160 |     |     |     |     | 1165 |     |     |     |     | 1170 |     |     |     |
| Lys | Val  | Leu | Ala | Met | Asp | Lys  | Ser | Ile | Asn | Thr | Thr  | Gly | Asp | Gly |
|     | 1175 |     |     |     |     | 1180 |     |     |     |     | 1185 |     |     |     |
| Val | Val  | Glu | Tyr | Val | Ser | Glu  | Lys | Ile | Lys | Asn | Asn  | Lys | Glu | Ala |
|     | 1190 |     |     |     |     | 1195 |     |     |     |     | 1200 |     |     |     |
| Phe | Met  | Leu | Gly | Leu | Thr | Tyr  | Met | Asn | Arg | Trp | Tyr  | Asp | Ile | Asn |
|     | 1205 |     |     |     |     | 1210 |     |     |     |     | 1215 |     |     |     |
| Tyr | Gly  | Lys | Met | Asn | Thr | Lys  | Asp | Leu | Ser | Thr | Tyr  | Lys | Phe | Asp |
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| Phe | Asn  | Gly | Asn | Asn | Glu | Thr  | Ser | Thr | Leu | Asp | Thr  | Ile | Val | Ala |
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| Gly | Leu  | Tyr | Ala | Asn | Lys | Leu  | Ala | Ser | Val | Lys | Gly  | Glu | Asp | Ser |
|     | 1265 |     |     |     |     | 1270 |     |     |     |     | 1275 |     |     |     |
| Val | Phe  | Asp | Phe | Val | Glu | Ala  | Tyr | Arg | Lys | Leu | Phe  | Leu | Pro | Asn |
|     | 1280 |     |     |     |     | 1285 |     |     |     |     | 1290 |     |     |     |
| Lys | Thr  | Asn | Asn | Glu | Trp | Phe  | Lys | Glu | Asn | Thr | Lys  | Ala | Tyr | Ile |
|     | 1295 |     |     |     |     | 1300 |     |     |     |     | 1305 |     |     |     |
| Val | Glu  | Met | Lys | Ser | Asp | Ile  | Ala | Glu | Val | Arg | Glu  | Lys | Gln | Glu |
|     | 1310 |     |     |     |     | 1315 |     |     |     |     | 1320 |     |     |     |
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 Arg Val 1400 Asp Ile Ala Ala Lys 1405 Arg His Arg Asp His 1410 Tyr Asp Ile  
 Trp Tyr 1415 Asn Leu Leu Asp Ser 1420 Ala Ser Lys Glu Lys 1425 Leu Phe Arg  
 Ser Val 1430 Ile Val Tyr Asp Gly 1435 Phe Asn Val Lys Asp 1440 Glu Thr Gly  
 Arg Thr 1445 Tyr Trp Ala Arg Leu 1450 Thr Asp Lys Asn Ile 1455 Gly Ser Ile  
 Lys Glu 1460 Phe Phe Gly Pro Val 1465 Gly Lys Trp Tyr Glu 1470 Tyr Asn Ser  
 Ser Ala 1475 Gly Ala Tyr Ala Asn 1480 Gly Ser Leu Thr His 1485 Phe Val Leu  
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 Arg Arg 1520 Glu Gly Leu Gly Ala 1525 Glu Leu Tyr Ala Leu 1530 Gly Leu Leu  
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| Phe | Arg  | Lys | Ile | Glu | Asn | Tyr  | Tyr | Val | Arg | Asp | Thr  | Arg | His | Asn |
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| Lys | Asp  | Thr | His | Ala | Gly | Asn  | Lys | Val | Arg | Pro | Leu  | Thr | Asp | Glu |
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| Glu | Val  | Ala | Asn | Leu | Thr | Ser  | Leu | Asn | Ser | Leu | Ile  | Asp | Asn | Asp |
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| Ile | Ile  | Asn | Arg | Arg | Ser | Tyr  | Asp | Asp | Ser | Arg | Glu  | Tyr | Lys | Arg |
|     | 1655 |     |     |     |     | 1660 |     |     |     |     | 1665 |     |     |     |
| Asn | Gly  | Tyr | Tyr | Thr | Ile | Ser  | Met | Phe | Ser | Pro | Val  | Tyr | Ala | Ala |
|     | 1670 |     |     |     |     | 1675 |     |     |     |     | 1680 |     |     |     |
| Leu | Ser  | Asn | Ser | Lys | Gly | Ala  | Pro | Gly | Asp | Ile | Met  | Phe | Arg | Lys |
|     | 1685 |     |     |     |     | 1690 |     |     |     |     | 1695 |     |     |     |
| Ile | Ala  | Tyr | Glu | Leu | Leu | Ala  | Glu | Lys | Gly | Tyr | His  | Lys | Gly | Phe |
|     | 1700 |     |     |     |     | 1705 |     |     |     |     | 1710 |     |     |     |
| Leu | Pro  | Tyr | Val | Ser | Asn | Gln  | Tyr | Gly | Ala | Glu | Ala  | Phe | Ala | Ser |
|     | 1715 |     |     |     |     | 1720 |     |     |     |     | 1725 |     |     |     |
| Gly | Ser  | Lys | Thr | Phe | Ser | Ser  | Trp | His | Gly | Arg | Asp  | Val | Ala | Leu |
|     | 1730 |     |     |     |     | 1735 |     |     |     |     | 1740 |     |     |     |
| Val | Thr  | Asp | Asp | Leu | Val | Phe  | Lys | Lys | Val | Phe | Asn  | Gly | Glu | Tyr |
|     | 1745 |     |     |     |     | 1750 |     |     |     |     | 1755 |     |     |     |
| Ser | Ser  | Trp | Ala | Asp | Phe | Lys  | Lys | Ala | Met | Phe | Lys  | Gln | Arg | Ile |
|     | 1760 |     |     |     |     | 1765 |     |     |     |     | 1770 |     |     |     |
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|     | 1790 |     |     |     |     | 1795 |     |     |     |     | 1800 |     |     |     |
| Gln | Met  | Gln | Gln | Leu | Ile | Asn  | Glu | Ala | Ala | Ala | Lys  | Asp | Ile | Thr |
|     | 1805 |     |     |     |     | 1810 |     |     |     |     | 1815 |     |     |     |
| Asn | Ile  | Asp | Arg | Ala | Thr | Ser  | His | Thr | Pro | Ala | Ser  | Trp | Val | His |

1820

1825

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Pro Gly Gln Val Leu Pro Glu Glu Thr Ser Gly Thr Lys Glu Gly Asp  
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Glu Val Ser Glu Glu Thr Ser Pro Ser Ser Leu Asp Thr Leu Phe Glu  
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Glu Thr Thr Pro Glu Gln Val Lys Gly Gly Val Lys Glu Asn Thr Lys  
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Asp Ser Ile Asp Val Pro Ala Ala Tyr Leu Glu Lys Ala Glu Gly Lys  
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Gly Pro Phe Thr Ala Gly Val Asn Gln Val Ile Pro Tyr Glu Leu Phe  
Page 130

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Gln Ala Leu Ile Asp Gln Phe Arg Ala Asn Gly Thr Gln Thr Tyr Ser  
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Ala Thr Val Asn Val Tyr Gly Asn Lys Asp Gly Lys Pro Asp Leu Asp  
725 730 735

Asn Ile Val Ala Thr Lys Lys Val Thr Ile Lys Ile Asn Val Lys Glu  
740 745 750

Thr Ser Asp Thr Ala Asn Gly Ser Leu Ser Pro Ser Asn Ser Gly Ser  
755 760 765

Gly Val Thr Pro Met Asn His Asn His Ala Thr Gly Thr Thr Asp Ser  
770 775 780

Met Pro Ala Asp Thr Met Thr Ser Ser Thr Asn Thr Met Ala Gly Glu  
785 790 795 800

Asn Met Ala Ala Ser Ala Asn Lys Met Ser Asp Thr Met Met Ser Glu  
805 810 815

Asp Lys Ala Met Leu Pro Asn Thr Gly Glu Thr Gln Thr Ser Met Ala  
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Ser Glu Thr Val Val Ser Thr Val Ser Gly Ser Glu Ala Glu Ala Lys  
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Glu Trp Ile Ala Gln Lys Glu Ser Gly Gly Ser Tyr Thr Ala Thr Asn  
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 100 105 110  
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 Val Ala Leu Ala Lys Lys Glu Val Glu Ala Lys Glu Leu Glu Ile Glu  
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 Lys Leu Gln Tyr Glu Ile Ser Thr Leu Glu Gln Glu Val Ala Thr Ala  
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 Gln His Gln Val Asp Asn Leu Lys Lys Leu Leu Ala Gly Ala Asp Pro  
 225 230 235 240  
 Asp Asp Gly Thr Glu Val Ile Glu Ala Lys Leu Lys Lys Gly Glu Ala  
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 260 265 270  
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Lys Gln Glu Asn Gly Met Trp Tyr Phe Tyr Asn Thr Asp Gly Ser Met  
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Asn Gly Ala Met Ala Thr Gly Trp Val Lys Asp Gly Asp Thr Trp Tyr

565

570

575

Tyr Leu Glu Ala Ser Gly Ala Met Lys Ala Ser Gln Trp Phe Lys Val  
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Trp Leu Gln Tyr Asn Gly Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Asp  
610 615 620

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Tyr Tyr Leu Asn Ala Asn Gly Ala Met Ala Thr Gly Trp Ala Lys Val  
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Asn Gly Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Ser Met Ala Thr Gly  
675 680 685

Trp Val Lys Asp Gly Asp Thr Trp Tyr Tyr Leu Glu Ala Ser Gly Ala  
690 695 700

Met Lys Ala Ser Gln Trp Phe Lys Val Ser Asp Lys Trp Tyr Tyr Val  
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35

40

45

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Phe Asp Phe Gln Val Leu Asp Val Lys Lys Ala Ser Gln Leu Glu His  
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Tyr Ile Ser Asp Arg Leu Ala Asn Gly Ala Thr Glu Gln  
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Pro Glu Gln Ser Tyr Pro Ile Ile His Val Thr Gly Thr Asn Gly Lys  
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Gly Ser Thr Ile Ala Phe Met Arg Glu Leu Phe Met Gly His Gly Lys  
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Lys Val Ala Thr Phe Thr Ser Pro His Ile Val Ser Ile Asn Asp Arg  
Page 138



Tyr Arg Pro Gln Ile Leu Phe Gly Ser Leu Lys Arg Lys Asp Tyr Gln  
 325 330 335

Gly Met Leu Gly Tyr Leu Thr Glu Lys Leu Pro Gln Val Glu Leu Lys  
 340 345 350

Val Thr Gly Phe Asp Tyr Gln Gly Ala Leu Asp Glu Arg Asp Val Thr  
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Gly Tyr Asp Ile Val Ser Ser Tyr Arg Glu Phe Ile Ser Asp Phe Glu  
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Glu Arg Ala Asp Ala Gln Asp Leu Leu Phe Val Thr Gly Ser Leu Tyr  
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<210> 154  
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<400> 154

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Ile Thr Val Arg His Gln Gly Gly Gly His Lys Arg Phe Tyr Arg Leu  
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Val Asp Phe Lys Arg Asn Lys Asp Asn Val Glu Ala Val Val Lys Thr  
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Ile Glu Tyr Asp Pro Asn Arg Ser Ala Asn Ile Ala Leu Val His Tyr  
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Thr Asp Gly Val Lys Ala Tyr Ile Ile Ala Pro Lys Gly Leu Glu Val  
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Gly Gln Arg Ile Val Ser Gly Pro Glu Ala Asp Ile Lys Val Gly Asn  
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Ala Leu Pro Leu Ala Asn Ile Pro Val Gly Thr Leu Ile His Asn Ile  
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Glu Leu Lys Pro Gly Arg Gly Gly Glu Leu Val Arg Ala Ala Gly Ala  
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Ser Ala Gln Val Leu Gly Ser Glu Gly Lys Tyr Val Leu Val Arg Leu  
165 170 175

Gln Ser Gly Glu Val Arg Met Ile Leu Gly Thr Cys Arg Ala Thr Val  
180 185 190

Gly Val Val Gly Asn Glu Gln His Gly Leu Val Asn Leu Gly Lys Ala  
195 200 205

Gly Arg Ser Arg Trp Lys Gly Ile Arg Pro Thr Val Arg Gly Ser Val  
210 215 220

Met Asn Pro Asn Asp His Pro His Gly Gly Gly Glu Gly Lys Ala Pro  
225 230 235 240

Val Gly Arg Lys Ala Pro Ser Thr Pro Trp Gly Lys Pro Ala Leu Gly  
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Arg Arg Asn Glu Lys  
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<400> 155

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Tyr Glu Gly Leu Ser Lys Leu Pro Arg Asn Ala Ser Pro Thr Arg Leu  
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His Asn Arg Cys Arg Val Thr Gly Arg Pro His Ser Val Tyr Arg Lys  
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Ile Pro Gly Val Thr Lys Ala Ser Trp  
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<210> 156  
 <211> 445  
 <212> PRT  
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<400> 156

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Ile Asp Pro Asp Ile Asn Arg Ala Ala Glu Lys Ile Tyr Gln Lys Ile  
 35 40 45

Thr Thr Lys Ala Ala Asn Leu Val Ala Val Gly Asp Glu Ile Ala Ala  
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Glu Leu Gly Ile Pro Ile Val Asn Lys Arg Val Ser Val Thr Pro Ile  
 65 70 75 80

Ser Leu Ile Gly Ala Ala Thr Asp Ala Thr Asp Tyr Val Val Leu Ala  
 85 90 95

Lys Ala Leu Asp Lys Ala Ala Lys Glu Ile Gly Val Asp Phe Ile Gly  
 100 105 110

Gly Phe Ser Ala Leu Val Gln Lys Gly Tyr Gln Lys Gly Asp Glu Ile  
 115 120 125

Leu Ile Asn Ser Ile Pro Arg Ala Leu Ala Glu Thr Asp Lys Val Cys  
 130 135 140

Ser Ser Val Asn Ile Gly Ser Thr Lys Ser Gly Ile Asn Met Thr Ala  
 145 150 155 160

Val Ala Asp Met Gly Arg Ile Ile Lys Glu Thr Ala Asn Leu Ser Asp  
 165 170 175

Met Gly Val Ala Lys Leu Val Val Phe Ala Asn Ala Val Glu Asp Asn  
 180 185 190

Pro Phe Met Ala Gly Ala Phe His Gly Val Gly Glu Ala Asp Val Ile  
 195 200 205  
 Ile Asn Val Gly Val Ser Gly Pro Gly Val Val Lys Arg Ala Leu Glu  
 210 215 220  
 Lys Val Arg Gly Gln Ser Phe Asp Val Val Ala Glu Thr Val Lys Lys  
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 Thr Ala Phe Lys Ile Thr Arg Ile Gly Gln Leu Val Gly Gln Met Ala  
 245 250 255  
 Ser Glu Arg Leu Gly Val Glu Phe Gly Ile Val Asp Leu Ser Leu Ala  
 260 265 270  
 Pro Thr Pro Ala Val Gly Asp Ser Val Ala Arg Val Leu Glu Glu Met  
 275 280 285  
 Gly Leu Glu Thr Val Gly Thr His Gly Thr Thr Ala Ala Leu Ala Leu  
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 Leu Asn Asp Gln Val Lys Lys Gly Gly Val Met Ala Cys Asn Gln Val  
 305 310 315 320  
 Gly Gly Leu Ser Gly Ala Phe Ile Pro Val Ser Glu Asp Glu Gly Met  
 325 330 335  
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 Met Thr Ala Ile Cys Ser Val Gly Leu Asp Met Ile Ala Ile Pro Glu  
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 Asp Thr Pro Ala Glu Thr Ile Ala Ala Met Ile Ala Asp Glu Ala Ala  
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 405 410 415  
 Pro Val Met Lys Val Asn Gly Ala Ser Ser Val Asp Phe Ile Ser Arg  
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<400> 157

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Tyr Glu Arg Tyr Lys Glu Gln Pro Asn Val Leu Lys Arg Ala Tyr Met  
 50 55 60

Leu Lys Glu Ile Leu Glu Asn Met Thr Ile Tyr Ile Glu Glu Glu Ser  
 65 70 75 80

Met Ile Ala Gly Asn Gln Ala Ser Ser Asn Lys Asp Ala Pro Ile Phe  
 85 90 95

Pro Glu Tyr Thr Leu Glu Phe Val Leu Asn Glu Leu Asp Leu Phe Glu  
 100 105 110

Lys Arg Asp Gly Asp Val Phe Tyr Ile Thr Glu Glu Thr Lys Glu Gln  
 115 120 125

Leu Arg Ser Ile Ala Pro Phe Trp Glu Asn Asn Asn Leu Arg Ala Arg  
 130 135 140

Ala Gly Ala Leu Leu Pro Glu Glu Val Ser Val Tyr Met Glu Thr Gly  
 145 150 155 160

Phe Phe Gly Met Glu Gly Lys Met Asn Ser Gly Asp Ala His Leu Ala  
 165 170 175

Val Asn Tyr Gln Lys Leu Leu Gln Phe Gly Leu Arg Gly Phe Glu Glu  
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Arg Ala Arg Lys Ala Lys Val Ala Leu Asp Leu Thr Asp Pro Ala Ser  
 195 200 205

Ile Asp Lys Tyr His Phe Tyr Asp Ser Ile Phe Ile Val Ile Asp Ala  
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 260 265 270  
 Ile Gln Ser Val Trp Phe Ile Gln Cys Ile Leu Gln Ile Glu Ser Asn  
 275 280 285  
 Gly His Ser Leu Ser Tyr Gly Arg Phe Asp Gln Tyr Met Tyr Pro Tyr  
 290 295 300  
 Met Lys Ala Asp Leu Glu Ser Gly Lys Glu Thr Glu Asp Ser Ile Val  
 305 310 315 320  
 Glu Arg Leu Thr Asn Leu Trp Ile Lys Thr Ile Thr Ile Asn Lys Val  
 325 330 335  
 Arg Ser Gln Ser His Thr Phe Ser Ser Ala Gly Ser Pro Leu Tyr Gln  
 340 345 350  
 Asn Val Thr Ile Gly Gly Gln Thr Arg Asp Lys Lys Asp Ala Val Asn  
 355 360 365  
 Pro Leu Ser Tyr Leu Val Leu Lys Ser Val Ala Gln Thr His Leu Pro  
 370 375 380  
 Gln Pro Asn Leu Thr Val Arg Tyr His Ala Gly Leu Asp Ala Arg Phe  
 385 390 395 400  
 Met Asn Glu Cys Ile Glu Val Met Lys Leu Gly Phe Gly Met Pro Ala  
 405 410 415  
 Phe Asn Asn Asp Glu Ile Ile Ile Pro Ser Phe Ile Ala Lys Gly Val  
 420 425 430  
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Ala Ser Gly Lys Arg Phe Ala Pro Ser Phe Gly Arg Phe Lys Asp Met  
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Lys Asn Phe Ser Glu Leu Glu Asn Ala Trp Asp Lys Thr Leu Arg Tyr  
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Leu Thr Arg Met Ser Val Ile Val Glu Asn Ser Ile Asp Leu Ser Leu  
515 520 525

Glu Arg Glu Val Pro Asp Ile Leu Cys Ser Ala Leu Thr Asp Asp Cys  
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Ile Gly Arg Gly Lys His Leu Lys Glu Gly Gly Ala Val Tyr Asp Tyr  
545 550 555 560

Ile Ser Gly Leu Gln Val Gly Ile Ala Asn Leu Ser Asp Ser Leu Ala  
565 570 575

Ala Ile Lys Lys Leu Val Phe Glu Glu Glu Arg Ile Ser Pro Ser Gln  
580 585 590

Leu Trp His Ala Leu Glu Thr Asp Tyr Ala Gly Glu Glu Gly Lys Val  
595 600 605

Ile Gln Glu Met Leu Ile His Asp Ala Pro Lys Tyr Gly Asn Asp Asp  
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Asp Tyr Ala Asp Lys Leu Val Thr Ala Ala Tyr Asp Ile Tyr Val Asp  
625 630 635 640

Glu Ile Ala Lys Tyr Pro Asn Thr Arg Tyr Gly Arg Gly Pro Ile Gly  
645 650 655

Gly Ile Arg Tyr Ser Gly Thr Ser Ser Ile Ser Ala Asn Val Gly Gln  
660 665 670

Gly Arg Gly Thr Leu Ala Thr Pro Asp Gly Arg Asn Ala Gly Thr Pro  
675 680 685

Leu Ala Glu Gly Cys Ser Pro Ser His Asn Met Asp Gln His Gly Pro  
690 695 700

Thr Ser Val Leu Lys Ser Val Ser Lys Leu Pro Thr Asp Glu Ile Val  
705 710 715 720

Gly Gly Val Leu Leu Asn Gln Lys Val Asn Pro Gln Thr Leu Ala Lys  
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725

730

735

Glu Glu Asp Lys Leu Lys Leu Ile Ala Leu Leu Arg Thr Phe Phe Asn  
                   740                  745                  750

Arg Leu His Gly Tyr His Ile Gln Tyr Asn Val Val Ser Arg Glu Thr  
                   755                  760                  765

Leu Ile Asp Ala Gln Lys His Pro Glu Lys His Arg Asp Leu Ile Val  
           770                  775                  780

Arg Val Ala Gly Tyr Ser Ala Phe Phe Asn Val Leu Ser Lys Ala Thr  
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<212> PRT

<213> Streptococcus pneumoniae

<400> 158

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Lys Asp Val Glu Glu Tyr Ile Pro His Ala Asp Leu Arg Leu Val Ile  
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Asn Gln Pro Phe Ala Val Thr Ser Thr Val Gly Ser Tyr Asp Val Phe  
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Val Asn Val Ile Gly Gly Gly Tyr Ala Gly Gln Ser Gly Ala Ile Arg  
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His Gly Ile Ala Arg Ala Leu Leu Gln Val Asp Pro Asp Phe Arg Asp  
                   85                  90                  95

Ser Leu Lys Arg Ala Gly Leu Leu Thr Arg Asp Ser Arg Lys Val Glu  
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Arg Lys Lys Pro Gly Leu Lys Lys Ala Arg Lys Ala Ser Gln Phe Ser  
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Lys Arg

130

<210> 159  
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<400> 159

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Tyr Lys Pro Ser Ile Val Ala Arg Ser Leu Asn Ser Lys Arg Thr Lys  
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Leu Ile Gly Val Leu Ile Gly Asp Ile Thr Asn Ser Phe Ser Asn Gln  
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Ile Val Lys Gly Ile Glu Asp Ile Ala Ser Gln Asn Gly Tyr Gln Val  
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Met Ile Gly Asn Ser Asn Tyr Ser Gln Glu Ser Glu Asp Arg Tyr Ile  
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Glu Ser Met Leu Leu Leu Gly Val Asp Gly Phe Ile Ile Gln Pro Thr  
 115 120 125

Ser Asn Phe Arg Lys Tyr Ser Arg Ile Ile Asp Glu Lys Lys Lys Lys  
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Met Val Phe Phe Asp Ser Gln Leu Tyr Glu His Arg Thr Ser Trp Val  
 145 150 155 160

Lys Thr Asn Asn Tyr Asp Ala Val Tyr Asp Met Thr Gln Ser Cys Ile  
 165 170 175

Glu Lys Gly Tyr Glu His Phe Leu Leu Ile Thr Ala Asp Thr Ser Arg  
 180 185 190

Leu Ser Thr Arg Ile Glu Arg Ala Ser Gly Phe Val Asp Ala Leu Thr  
 195 200 205

Asp Ala Asn Met Arg His Ala Ser Leu Thr Ile Glu Asp Lys His Thr  
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210

215

Asn Leu Glu Gln Ile Lys Glu Phe Leu Gln Lys Glu Ile Asp Pro Asp  
225 230 235 240

Glu Lys Thr Leu Val Phe Ile Pro Asn Cys Trp Ala Leu Pro Leu Val  
245 250 255

Phe Thr Val Ile Lys Glu Leu Asn Tyr Asn Leu Pro Gln Val Gly Leu  
260 265 270

Ile Gly Phe Asp Asn Thr Glu Trp Thr Cys Phe Ser Ser Pro Ser Val  
275 280 285

Ser Thr Leu Val Gln Pro Ser Phe Glu Glu Gly Gln Gln Ala Thr Lys  
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Ile Leu Ile Asp Gln Ile Glu Gly Arg Asn Gln Glu Glu Arg Gln Gln  
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Val Leu Asp Cys Ser Val Asn Trp Lys Glu Ser Thr Phe  
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Leu Pro Ala Asp Leu Ala Thr Ala Leu Ala Thr Ala Lys Glu Asn Asp  
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Gly Arg Asp Phe Glu Ala Pro Lys Val Gly Glu Asp Gln Gly Ser Pro  
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Glu Val Thr Asp Gly Pro Lys Thr Glu Glu Glu Leu Leu Ala Leu Glu  
85 90 95

Lys Glu Lys Pro Ala Glu Glu Lys Pro Lys Glu Asp Lys Pro Ala Ala  
Page 149

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Ala Lys Pro Glu Thr Pro Lys Thr Val Thr Pro Glu Trp Gln Thr Val
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Val Arg Tyr Asn Gln Leu Ser Ser Thr Ala Gln Asn Asp Asn Ala Gly
145                               150                               155
Lys Pro Ala Leu Phe Glu Lys Lys Gly Leu Thr Val Asp Ala Asn Gly
165                               170                               175
Asn Ala Thr Val Asp Leu Thr Phe Lys Asp Asp Ser Glu Lys Gly Lys
180                               185                               190
Ser Arg Phe Gly Val Phe Leu Lys Phe Lys Asp Thr Lys Asn Asn Val
195                               200                               205
Phe Val Gly Tyr Asp Lys Asp Gly Trp Phe Trp Glu Tyr Lys Ser Pro
210                               215                               220
Thr Thr Ser Thr Trp Tyr Arg Gly Ser Arg Val Ala Ala Pro Glu Thr
225                               230                               235
Gly Ser Thr Asn Arg Leu Ser Ile Thr Leu Lys Ser Asp Gly Gln Leu
245                               250                               255
Asn Ala Ser Asn Asn Asp Val Asn Leu Phe Asp Thr Val Thr Leu Pro
260                               265                               270
Ala Ala Val Asn Asp His Leu Lys Asn Glu Lys Lys Ile Leu Leu Lys
275                               280                               285
Ala Gly Ser Tyr Asp Asp Glu Arg Thr Val Val Ser Val Lys Thr Asp
290                               295                               300
Asn Gln Glu Gly Val Lys Thr Glu Asp Thr Pro Ala Glu Lys Glu Thr
305                               310                               315
Gly Pro Glu Val Asp Asp Ser Lys Val Thr Tyr Asp Thr Ile Gln Ser
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Lys Val Leu Lys Ala Val Ile Asp Gln Ala Phe Pro Arg Val Lys Glu
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Tyr Ser Leu Asn Gly His Thr Leu Pro Gly Gln Val Gln Gln Phe Asn  
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 Lys Ile Asn Glu Thr Thr Ala Glu Tyr Leu Met Lys Leu Arg Asp Asp  
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 Ala His Leu Ile Asn Ala Glu Met Thr Val Arg Leu Gln Val Val Asp  
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 Asn Gln Leu His Phe Asp Val Thr Lys Ile Val Asn His Asn Gln Val  
 420 425 430  
 Thr Pro Gly Gln Lys Ile Asp Asp Glu Ser Lys Leu Leu Ser Ser Ile  
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 Asp Asp His Ile Asp Val Thr Asn Pro Met Lys Asp Leu Ala Lys Gly  
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 Tyr Met Tyr Gly Phe Val Ser Thr Asp Lys Leu Ala Ala Gly Val Trp  
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 515 520 525  
 Leu Thr Ala Tyr Lys Glu Thr Val Gly Asn Ala Asn Tyr Val Gly Ile  
 530 535 540  
 His Ser Ser Glu Trp Gln Trp Glu Lys Ala Tyr Lys Gly Ile Val Phe  
 545 550 555 560  
 Pro Glu Tyr Thr Lys Glu Leu Pro Ser Ala Lys Val Val Ile Thr Glu  
 565 570 575  
 Asp Ala Asn Ala Asp Lys Asn Val Asp Trp Gln Asp Gly Ala Ile Ala  
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 Tyr Arg Ser Ile Met Asn Asn Pro Gln Gly Trp Glu Lys Val Lys Asp  
 595 600 605

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Ile Thr Ala Tyr Arg Ile Ala Met Asn Phe Gly Ser Gln Ala Gln Asn  
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 Pro Phe Leu Met Thr Leu Asp Gly Ile Lys Lys Ile Asn Leu His Thr  
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 Asp Gly Leu Gly Gln Gly Val Leu Leu Lys Gly Tyr Gly Ser Glu Gly  
 645 650 655  
 His Asp Ser Gly His Leu Asn Tyr Ala Asp Ile Gly Lys Arg Ile Gly  
 660 665 670  
 Gly Val Glu Asp Phe Lys Thr Leu Ile Glu Lys Ala Lys Lys Tyr Gly  
 675 680 685  
 Ala His Leu Gly Ile His Val Asn Ala Ser Glu Thr Tyr Pro Glu Ser  
 690 695 700  
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 Ser Tyr Gly Trp Asn Trp Leu Asp Gln Gly Ile Asn Ile Asp Ala Ala  
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 Tyr Asp Leu Ala His Gly Arg Leu Ala Arg Trp Glu Asp Leu Lys Lys  
 740 745 750  
 Lys Leu Gly Asp Gly Leu Asp Phe Ile Tyr Val Asp Val Trp Gly Asn  
 755 760 765  
 Gly Gln Ser Gly Asp Asn Gly Ala Trp Ala Thr His Val Leu Ala Lys  
 770 775 780  
 Glu Ile Asn Lys Gln Gly Trp Arg Phe Ala Ile Glu Trp Gly His Gly  
 785 790 795 800  
 Gly Glu Tyr Asp Ser Thr Phe His His Trp Ala Ala Asp Leu Thr Tyr  
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 Arg Asn His Gln Lys Asp Ala Trp Val Gly Asp Tyr Arg Ser Tyr Gly  
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 Gly Ala Ala Asn Tyr Pro Leu Leu Gly Gly Tyr Ser Met Lys Asp Phe  
 850 855 860

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 Phe Ala His Asp Val Met Thr Lys Tyr Phe Gln His Phe Thr Val Ser  
 885 890 895  
 Lys Trp Glu Asn Gly Thr Pro Val Thr Met Thr Asp Asn Gly Ser Thr  
 900 905 910  
 Tyr Lys Trp Thr Pro Glu Met Arg Val Glu Leu Val Asp Ala Asp Asn  
 915 920 925  
 Asn Lys Val Val Val Thr Arg Lys Ser Asn Asp Val Asn Ser Pro Gln  
 930 935 940  
 Tyr Arg Glu Arg Thr Val Thr Leu Asn Gly Arg Val Ile Gln Asp Gly  
 945 950 955 960  
 Ser Ala Tyr Leu Thr Pro Trp Asn Trp Asp Ala Asn Gly Lys Lys Leu  
 965 970 975  
 Ser Thr Asp Lys Glu Lys Met Tyr Tyr Phe Asn Thr Gln Ala Gly Ala  
 980 985 990  
 Thr Thr Trp Thr Leu Pro Ser Asp Trp Ala Lys Ser Lys Val Tyr Leu  
 995 1000 1005  
 Tyr Lys Leu Thr Asp Gln Gly Lys Thr Glu Glu Gln Glu Leu Thr  
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 Val Lys Asp Gly Lys Ile Thr Leu Asp Leu Leu Ala Asn Gln Pro  
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 Ser Glu Gly Met His Ile Tyr Asp Gln Gly Phe Asn Ser Gly Thr  
 1055 1060 1065  
 Leu Lys His Trp Thr Ile Ser Gly Asp Ala Ser Lys Ala Glu Ile  
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 Val Lys Ser Gln Gly Ala Asn Asp Met Leu Arg Ile Gln Gly Asn  
 1085 1090 1095  
 Lys Glu Lys Val Ser Leu Thr Gln Lys Leu Thr Gly Leu Lys Pro

|                         |                     |                 |  |      |
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| Ala Lys Ala Ser Ile Thr | Val Asn Thr Gly Glu | Lys Glu Val Thr |  |      |
| 1130                    | 1135                | 1140            |  |      |
| Thr Tyr Thr Asn Lys Ser | Leu Ala Leu Asn Tyr | Val Lys Ala Tyr |  |      |
| 1145                    | 1150                | 1155            |  |      |
| Ala His Asn Thr Arg Arg | Asp Asn Ala Thr Val | Asp Asp Thr Ser |  |      |
| 1160                    | 1165                | 1170            |  |      |
| Tyr Phe Gln Asn Met Tyr | Ala Phe Phe Thr Thr | Gly Ala Asp Val |  |      |
| 1175                    | 1180                | 1185            |  |      |
| Ser Asn Val Thr Leu Thr | Leu Ser Arg Glu Ala | Gly Asp Gln Ala |  |      |
| 1190                    | 1195                | 1200            |  |      |
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| 1235                    | 1240                | 1245            |  |      |
| Val Glu Gly Val Glu Asp | Asn Arg Thr His Leu | Ser Glu Lys His |  |      |
| 1250                    | 1255                | 1260            |  |      |
| Asn Pro Tyr Thr Gln Arg | Gly Trp Asn Gly Lys | Lys Val Asp Asp |  |      |
| 1265                    | 1270                | 1275            |  |      |
| Val Ile Glu Gly Asn Trp | Ser Leu Lys Thr Asn | Gly Leu Val Ser |  |      |
| 1280                    | 1285                | 1290            |  |      |
| Arg Arg Asn Leu Val Tyr | Gln Thr Ile Pro Gln | Asn Phe Arg Phe |  |      |
| 1295                    | 1300                | 1305            |  |      |
| Glu Ala Gly Lys Thr Tyr | Arg Val Thr Phe Glu | Tyr Glu Ala Gly |  |      |
| 1310                    | 1315                | 1320            |  |      |
| Ser Asp Asn Thr Tyr Ala | Phe Val Val Gly Lys | Gly Glu Phe Gln |  |      |
| 1325                    | 1330                | 1335            |  |      |

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| Ser | Gly  | Arg | Arg | Gly | Thr | Gln  | Ala | Ser | Asn | Leu | Glu  | Met | His | Glu |
|     | 1340 |     |     |     |     | 1345 |     |     |     |     | 1350 |     |     |     |
| Leu | Pro  | Asn | Thr | Trp | Thr | Asp  | Ser | Lys | Lys | Ala | Lys  | Lys | Ala | Thr |
|     | 1355 |     |     |     |     | 1360 |     |     |     |     | 1365 |     |     |     |
| Phe | Leu  | Val | Thr | Gly | Ala | Glu  | Thr | Gly | Asp | Thr | Trp  | Val | Gly | Ile |
|     | 1370 |     |     |     |     | 1375 |     |     |     |     | 1380 |     |     |     |
| Tyr | Ser  | Thr | Gly | Asn | Ala | Ser  | Asn | Thr | Arg | Gly | Asp  | Ser | Gly | Gly |
|     | 1385 |     |     |     |     | 1390 |     |     |     |     | 1395 |     |     |     |
| Asn | Ala  | Asn | Phe | Arg | Gly | Tyr  | Asn | Asp | Phe | Met | Met  | Asp | Asn | Leu |
|     | 1400 |     |     |     |     | 1405 |     |     |     |     | 1410 |     |     |     |
| Gln | Ile  | Glu | Glu | Ile | Thr | Leu  | Thr | Gly | Lys | Met | Leu  | Thr | Glu | Asn |
|     | 1415 |     |     |     |     | 1420 |     |     |     |     | 1425 |     |     |     |
| Ala | Leu  | Lys | Asn | Tyr | Leu | Pro  | Thr | Val | Ala | Met | Thr  | Asn | Tyr | Thr |
|     | 1430 |     |     |     |     | 1435 |     |     |     |     | 1440 |     |     |     |
| Lys | Glu  | Ser | Met | Asp | Ala | Leu  | Lys | Glu | Ala | Val | Phe  | Asn | Leu | Ser |
|     | 1445 |     |     |     |     | 1450 |     |     |     |     | 1455 |     |     |     |
| Gln | Ala  | Asp | Asp | Asp | Ile | Ser  | Val | Glu | Glu | Ala | Arg  | Ala | Glu | Ile |
|     | 1460 |     |     |     |     | 1465 |     |     |     |     | 1470 |     |     |     |
| Ala | Lys  | Ile | Glu | Ala | Leu | Lys  | Asn | Ala | Leu | Val | Gln  | Lys | Lys | Thr |
|     | 1475 |     |     |     |     | 1480 |     |     |     |     | 1485 |     |     |     |
| Ala | Leu  | Val | Ala | Asp | Asp | Phe  | Ala | Ser | Leu | Thr | Ala  | Pro | Ala | Gln |
|     | 1490 |     |     |     |     | 1495 |     |     |     |     | 1500 |     |     |     |
| Ala | Gln  | Glu | Gly | Leu | Ala | Asn  | Ala | Phe | Asp | Gly | Asn  | Val | Ser | Ser |
|     | 1505 |     |     |     |     | 1510 |     |     |     |     | 1515 |     |     |     |
| Leu | Trp  | His | Thr | Ser | Trp | Asn  | Gly | Gly | Asp | Val | Gly  | Lys | Pro | Ala |
|     | 1520 |     |     |     |     | 1525 |     |     |     |     | 1530 |     |     |     |
| Thr | Met  | Val | Leu | Lys | Glu | Pro  | Thr | Glu | Ile | Thr | Gly  | Leu | Arg | Tyr |
|     | 1535 |     |     |     |     | 1540 |     |     |     |     | 1545 |     |     |     |
| Val | Pro  | Arg | Gly | Ser | Gly | Ser  | Asn | Gly | Asn | Leu | Arg  | Asp | Val | Lys |
|     | 1550 |     |     |     |     | 1555 |     |     |     |     | 1560 |     |     |     |
| Leu | Val  | Val | Thr | Asp | Glu | Ser  | Gly | Lys | Glu | His | Thr  | Phe | Thr | Ala |
|     | 1565 |     |     |     |     | 1570 |     |     |     |     | 1575 |     |     |     |

1028462\_1.TXT

Thr Asp Trp Pro Asn Asn Asn Lys Pro Lys Asp Ile Asp Phe Gly  
 1580 1585 1590

Lys Thr Ile Lys Ala Lys Lys Ile Val Leu Thr Gly Thr Lys Thr  
 1595 1600 1605

Tyr Gly Asp Gly Gly Asp Lys Tyr Gln Ser Ala Ala Glu Leu Ile  
 1610 1615 1620

Phe Thr Arg Pro Gln Val Ala Glu Thr Pro Leu Asp Leu Ser Gly  
 1625 1630 1635

Tyr Glu Ala Ala Leu Val Lys Ala Gln Lys Leu Thr Asp Lys Asp  
 1640 1645 1650

Asn Gln Glu Glu Val Ala Ser Val Gln Ala Ser Met Lys Tyr Ala  
 1655 1660 1665

Thr Asp Asn His Leu Leu Thr Glu Arg Met Val Glu Tyr Phe Ala  
 1670 1675 1680

Asp Tyr Leu Asn Gln Leu Lys Asp Ser Ala Thr Lys Pro Asp Ala  
 1685 1690 1695

Pro Thr Val Glu Lys Pro Glu Phe Lys Leu Arg Ser Leu Ala Ser  
 1700 1705 1710

Glu Gln Gly Lys Thr Pro Asp Tyr Lys Gln Glu Ile Ala Arg Pro  
 1715 1720 1725

Glu Thr Pro Glu Gln Ile Leu Pro Ala Thr Gly Glu Ser Gln Ser  
 1730 1735 1740

Asp Thr Ala Leu Ile Leu Ala Ser Val Ser Leu Ala Leu Ser Ala  
 1745 1750 1755

Leu Phe Val Val Lys Thr Lys Lys Asp  
 1760 1765

<210> 161  
 <211> 719  
 <212> PRT  
 <213> Streptococcus pneumoniae  
 <400> 161

Met Asn Lys Pro Thr Ile Leu Arg Leu Ile Lys Tyr Leu Ser Ile Ser  
 1 5 10 15



## 1028462\_1.TXT

Phe Leu Ser Leu Val Ile Ala Ala Ile Val Leu Gly Gly Gly Val Phe  
           20                  25                  30  
 Phe Tyr Tyr Val Ser Lys Ala Pro Ser Leu Ser Glu Ser Lys Leu Val  
           35                  40                  45  
 Ala Thr Thr Ser Ser Lys Ile Tyr Asp Asn Lys Asn Gln Leu Ile Ala  
           50                  55                  60  
 Asp Leu Gly Ser Glu Arg Arg Val Asn Ala Gln Ala Asn Asp Ile Pro  
   65                  70                  75                  80  
 Thr Asp Leu Val Lys Ala Ile Val Ser Ile Glu Asp His Arg Phe Phe  
           85                  90                  95  
 Asp His Arg Gly Ile Asp Thr Ile Arg Ile Leu Gly Ala Phe Leu Arg  
          100                 105                 110  
 Asn Leu Gln Ser Asn Ser Leu Gln Gly Gly Ser Thr Leu Thr Gln Gln  
          115                 120                 125  
 Leu Ile Lys Leu Thr Tyr Phe Ser Thr Ser Thr Ser Asp Gln Thr Ile  
          130                 135                 140  
 Ser Arg Lys Ala Gln Glu Ala Trp Leu Ala Ile Gln Leu Glu Gln Lys  
   145                 150                 155                 160  
 Ala Thr Lys Gln Glu Ile Leu Thr Tyr Tyr Ile Asn Lys Val Tyr Met  
          165                 170                 175  
 Ser Asn Gly Asn Tyr Gly Met Gln Thr Ala Ala Gln Asn Tyr Tyr Gly  
          180                 185                 190  
 Lys Asp Leu Asn Asn Leu Ser Leu Pro Gln Leu Ala Leu Leu Ala Gly  
          195                 200                 205  
 Met Pro Gln Ala Pro Asn Gln Tyr Asp Pro Tyr Ser His Pro Glu Ala  
          210                 215                 220  
 Ala Gln Asp Arg Arg Asn Leu Val Leu Ser Glu Met Lys Asn Gln Gly  
   225                 230                 235                 240  
 Tyr Ile Ser Ala Glu Gln Tyr Glu Lys Ala Val Asn Thr Pro Ile Thr  
          245                 250                 255  
 Asp Gly Leu Gln Ser Leu Lys Ser Ala Ser Asn Tyr Pro Ala Tyr Met  
          260                 265                 270

1028462\_1.TXT

Asp Asn Tyr Leu Lys Glu Val Ile Asn Gln Val Glu Glu Glu Thr Gly  
 275 280 285  
 Tyr Asn Leu Leu Thr Thr Gly Met Asp Val Tyr Thr Asn Val Asp Gln  
 290 295 300  
 Glu Ala Gln Lys His Leu Trp Asp Ile Tyr Asn Thr Asp Glu Tyr Val  
 305 310 315 320  
 Ala Tyr Pro Asp Asp Glu Leu Gln Val Ala Ser Thr Ile Val Asp Val  
 325 330 335  
 Ser Asn Gly Lys Val Ile Ala Gln Leu Gly Ala Arg His Gln Ser Ser  
 340 345 350  
 Asn Val Ser Phe Gly Ile Asn Gln Ala Val Glu Thr Asn Arg Asp Trp  
 355 360 365  
 Gly Ser Thr Met Lys Pro Ile Thr Asp Tyr Ala Pro Ala Leu Glu Tyr  
 370 375 380  
 Gly Val Tyr Asp Ser Thr Ala Thr Ile Val His Asp Glu Pro Tyr Asn  
 385 390 395 400  
 Tyr Pro Gly Thr Asn Thr Pro Val Tyr Asn Trp Asp Arg Gly Tyr Phe  
 405 410 415  
 Gly Asn Ile Thr Leu Gln Tyr Ala Leu Gln Gln Ser Arg Asn Val Pro  
 420 425 430  
 Ala Val Glu Thr Leu Asn Lys Val Gly Leu Asn Arg Ala Lys Thr Phe  
 435 440 445  
 Leu Asn Gly Leu Gly Ile Asp Tyr Pro Ser Ile His Tyr Ser Asn Ala  
 450 455 460  
 Ile Ser Ser Asn Thr Thr Glu Ser Asp Lys Lys Tyr Gly Ala Ser Ser  
 465 470 475 480  
 Glu Lys Met Ala Ala Ala Tyr Ala Ala Phe Ala Asn Gly Gly Thr Tyr  
 485 490 495  
 Tyr Lys Pro Met Tyr Ile His Lys Val Val Phe Ser Asp Gly Ser Glu  
 500 505 510  
 Lys Glu Phe Ser Asn Val Gly Thr Arg Ala Met Lys Glu Thr Thr Ala

515

520

525

Tyr Met Met Thr Asp Met Met Lys Thr Val Leu Thr Tyr Gly Thr Gly  
530 535 540

Arg Asn Ala Tyr Leu Ala Trp Leu Pro Gln Ala Gly Lys Thr Gly Thr  
545 550 555 560

Ser Asn Tyr Thr Asp Glu Glu Ile Glu Asn His Ile Lys Thr Ser Gln  
565 570 575

Phe Val Ala Pro Asp Glu Leu Phe Ala Gly Tyr Thr Arg Lys Tyr Ser  
580 585 590

Met Ala Val Trp Thr Gly Tyr Ser Asn Arg Leu Thr Pro Leu Val Gly  
595 600 605

Asn Gly Leu Thr Val Ala Ala Lys Val Tyr Arg Ser Met Met Thr Tyr  
610 615 620

Leu Ser Glu Gly Ser Asn Pro Glu Asp Trp Asn Ile Pro Glu Gly Leu  
625 630 635 640

Tyr Arg Asn Gly Glu Phe Val Phe Lys Asn Gly Ala Arg Ser Thr Trp  
645 650 655

Asn Ser Pro Ala Pro Gln Gln Pro Pro Ser Thr Glu Ser Ser Ser  
660 665 670

Ser Ser Asp Ser Ser Thr Ser Gln Ser Ser Ser Thr Thr Pro Ser Thr  
675 680 685

Asn Asn Ser Thr Thr Thr Asn Pro Asn Asn Asn Thr Gln Gln Ser Asn  
690 695 700

Thr Thr Pro Asp Gln Gln Asn Gln Asn Pro Gln Pro Ala Gln Pro  
705 710 715

<210> 162  
<211> 464  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 162

Met Ser Lys Lys Arg Arg Asn Arg His Lys Lys Glu Gly Gln Glu Pro  
1 5 10 15

Gln Phe Asp Phe Asp Glu Ala Lys Glu Leu Thr Val Gly Gln Ala Ile  
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20

25

30

Arg Lys Asn Glu Glu Val Glu Ser Gly Val Leu Pro Glu Asp Ser Ile  
 35 40 45  
 Leu Asp Lys Tyr Val Lys Gln His Arg Asp Glu Ile Glu Ala Asp Lys  
 50 55 60  
 Phe Ala Thr Arg Gln Tyr Lys Lys Glu Glu Phe Val Glu Thr Gln Ser  
 65 70 75 80  
 Leu Asp Asp Leu Ile Gln Glu Met Arg Glu Ala Val Glu Lys Ser Glu  
 85 90 95  
 Ala Ser Ser Glu Glu Val Pro Ser Ser Glu Asp Ile Leu Leu Pro Leu  
 100 105 110  
 Pro Leu Asp Asp Glu Glu Gln Gly Leu Asp Pro Leu Leu Leu Asp Asp  
 115 120 125  
 Glu Asn Pro Thr Glu Met Thr Glu Glu Val Glu Glu Glu Gln Asn Leu  
 130 135 140  
 Ser Arg Leu Asp Gln Glu Asp Ser Glu Lys Lys Ser Lys Lys Gly Phe  
 145 150 155 160  
 Ile Leu Thr Val Leu Ala Leu Val Ser Val Ile Ile Cys Val Ser Ala  
 165 170 175  
 Tyr Tyr Val Tyr Arg Gln Val Ala Arg Ser Thr Lys Glu Ile Glu Thr  
 180 185 190  
 Ser Gln Ser Thr Thr Ala Asn Gln Ser Asp Val Asp Asp Phe Asn Thr  
 195 200 205  
 Leu Tyr Asp Ala Phe Tyr Thr Asp Ser Asn Lys Thr Ala Leu Lys Asn  
 210 215 220  
 Ser Gln Phe Asp Lys Leu Ser Gln Leu Lys Thr Leu Leu Asp Lys Leu  
 225 230 235 240  
 Glu Gly Ser Arg Glu His Thr Leu Ala Lys Ser Lys Tyr Asp Ser Leu  
 245 250 255  
 Ala Thr Gln Ile Lys Ala Ile Gln Asp Val Asn Ala Gln Phe Glu Lys  
 260 265 270

1028462\_1.TXT

Pro Ala Ile Val Asp Gly Val Leu Asp Thr Asn Ala Lys Ala Lys Ser  
275 280 285

Asp Ala Lys Phe Thr Asp Ile Lys Thr Gly Asn Thr Glu Leu Asp Lys  
290 295 300

Val Leu Asp Lys Ala Ile Ser Leu Gly Lys Ser Gln Gln Thr Ser Thr  
305 310 315 320

Ser Ser Ser Ser Ser Gln Thr Ser Ser Ser Ser Ser Gln Ala  
325 330 335

Ser Ser Asn Thr Thr Ser Glu Pro Lys Pro Ser Ser Ser Asn Glu Thr  
340 345 350

Arg Ser Ser Arg Ser Glu Val Asn Met Gly Leu Ser Ser Ala Gly Val  
355 360 365

Ala Val Gln Arg Ser Ala Ser Arg Val Ala Tyr Asn Gln Ser Ala Ile  
370 375 380

Asp Asp Ser Asn Asn Ser Ala Trp Asp Phe Ala Asp Gly Val Leu Glu  
385 390 395 400

Gln Ile Leu Ala Thr Ser Arg Ser Arg Gly Tyr Ile Thr Gly Asp Gln  
405 410 415

Tyr Ile Leu Glu Arg Val Asn Ile Val Asn Gly Asn Gly Tyr Tyr Asn  
420 425 430

Leu Tyr Lys Pro Asp Gly Thr Tyr Leu Phe Thr Leu Asn Cys Lys Thr  
435 440 445

Gly Tyr Phe Val Gly Asn Gly Ala Gly His Ala Asp Asp Leu Asp Tyr  
450 455 460

<210> 163  
<211> 340  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 163

Met Lys Leu Leu Lys Lys Met Met Gln Val Ala Leu Ala Val Phe Phe  
1 5 10 15

Phe Gly Leu Leu Ala Thr Asn Thr Val Phe Ala Asn Thr Thr Gly Gly  
20 25 30

## 1028462\_1.TXT

Arg Phe Val Asp Lys Asp Asn Arg Lys Tyr Tyr Val Lys Asp Asp His  
 35 40 45  
 Lys Ala Ile Tyr Trp His Lys Ile Asp Gly Lys Thr Tyr Tyr Phe Gly  
 50 55 60  
 Asp Ile Gly Glu Met Val Val Gly Trp Gln Tyr Leu Glu Ile Pro Gly  
 65 70 75 80  
 Thr Gly Tyr Arg Asp Asn Leu Phe Asp Asn Gln Pro Val Asn Glu Ile  
 85 90 95  
 Gly Leu Gln Glu Lys Trp Tyr Tyr Phe Gly Gln Asp Gly Ala Leu Leu  
 100 105 110  
 Glu Gln Thr Asp Lys Gln Val Leu Glu Ala Lys Thr Ser Glu Asn Thr  
 115 120 125  
 Gly Lys Val Tyr Gly Glu Gln Tyr Pro Leu Ser Ala Glu Lys Arg Thr  
 130 135 140  
 Tyr Tyr Phe Asp Asn Asn Tyr Ala Val Lys Thr Gly Trp Ile Tyr Glu  
 145 150 155 160  
 Glu Gly His Trp Tyr Tyr Leu Asn Lys Leu Gly Asn Phe Gly Asp Asp  
 165 170 175  
 Ser Tyr Asn Pro Leu Pro Ile Gly Glu Val Ala Lys Gly Trp Thr Gln  
 180 185 190  
 Asp Phe His Val Thr Ile Asp Ile Asp Arg Ser Lys Pro Ala Pro Trp  
 195 200 205  
 Tyr Tyr Leu Asp Ala Ser Gly Lys Met Leu Thr Asp Trp Gln Lys Val  
 210 215 220  
 Asn Gly Lys Trp Tyr Tyr Phe Gly Ser Ser Gly Ser Met Ala Thr Gly  
 225 230 235 240  
 Trp Lys Tyr Val Arg Gly Lys Trp Tyr Tyr Leu Asp Asn Lys Asn Gly  
 245 250 255  
 Asp Met Lys Thr Gly Trp Gln Tyr Leu Gly Asn Lys Trp Tyr Tyr Leu  
 260 265 270  
 Arg Ser Ser Gly Ala Met Val Thr Gly Trp Tyr Gln Asp Gly Ser Thr  
 275 280 285

1028462\_1.TXT

Trp Tyr Tyr Leu Asp Pro Ser Asn Gly Asp Met Lys Ile Gly Trp Thr  
290 295 300

Lys Val Asn Gly Lys Trp Tyr Tyr Leu Asn Ser Asn Gly Ala Met Val  
305 310 315 320

Thr Gly Ser Gln Thr Ile Asp Gly Lys Val Tyr Asn Phe Ala Ser Ser  
325 330 335

Gly Glu Trp Ile  
340

<210> 164  
<211> 332  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 164

Met Lys Ile Leu Lys Lys Thr Met Gln Val Gly Leu Thr Val Phe Phe  
1 5 10 15

Phe Gly Leu Leu Gly Thr Ser Thr Val Phe Ala Asp Asp Ser Glu Gly  
20 25 30

Trp Gln Phe Val Gln Glu Asn Gly Arg Thr Tyr Tyr Lys Lys Gly Asp  
35 40 45

Leu Lys Glu Thr Tyr Trp Arg Val Ile Asp Gly Lys Tyr Tyr Tyr Phe  
50 55 60

Asp Ser Leu Ser Gly Glu Met Val Val Gly Trp Gln Tyr Ile Pro Phe  
65 70 75 80

Pro Ser Lys Gly Ser Thr Ile Gly Pro Tyr Pro Asn Gly Ile Arg Leu  
85 90 95

Glu Gly Phe Pro Lys Ser Glu Trp Tyr Tyr Phe Asp Lys Asn Gly Val  
100 105 110

Leu Gln Glu Phe Val Gly Trp Lys Thr Leu Glu Ile Lys Thr Lys Asp  
115 120 125

Ser Val Gly Arg Lys Tyr Gly Glu Lys Arg Glu Asp Ser Glu Asp Lys  
130 135 140

Glu Glu Lys Arg Tyr Tyr Thr Asn Tyr Tyr Phe Asn Gln Asn His Ser  
145 150 155 160

1028462\_1.TXT

Leu Glu Thr Gly Trp Leu Tyr Asp Gln Ser Asn Trp Tyr Tyr Leu Ala  
165 170 175

Lys Thr Glu Ile Asn Gly Glu Asn Tyr Leu Gly Gly Glu Arg Arg Ala  
180 185 190

Gly Trp Ile Asn Asp Asp Ser Thr Trp Tyr Tyr Leu Asp Pro Thr Thr  
195 200 205

Gly Ile Met Gln Thr Gly Trp Gln Tyr Leu Gly Asn Lys Trp Tyr Tyr  
210 215 220

Leu Arg Ser Ser Gly Ala Met Ala Thr Gly Trp Tyr Gln Glu Gly Thr  
225 230 235 240

Thr Trp Tyr Tyr Leu Asp His Pro Asn Gly Asp Met Lys Thr Gly Trp  
245 250 255

Gln Asn Leu Gly Asn Lys Trp Tyr Tyr Leu Arg Ser Ser Gly Ala Met  
260 265 270

Ala Thr Gly Trp Tyr Gln Asp Gly Ser Thr Trp Tyr Tyr Leu Asn Ala  
275 280 285

Gly Asn Gly Asp Met Lys Thr Gly Trp Phe Gln Val Asn Gly Asn Trp  
290 295 300

Tyr Tyr Ala Tyr Ser Ser Gly Ala Leu Ala Val Asn Thr Thr Val Asp  
305 310 315 320

Gly Tyr Ser Val Asn Tyr Asn Gly Glu Trp Val Arg  
325 330

<210> 165  
<211> 285  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 165

Met Val Leu Ser Lys Tyr Tyr Gly Val Ala Asp Gly Met Asn Val Glu  
1 5 10 15

Gly Arg Gly Ser Ala Asn Phe Ile Lys Asp Asn Val Leu Ile Thr Ala  
20 25 30

Ala His Asn Tyr Tyr Arg His Asp Tyr Gly Lys Glu Ala Asp Asp Ile  
35 40 45



## 1028462\_1.TXT

Tyr Val Leu Pro Ala Val Ser Pro Ser Gln Glu Pro Phe Gly Lys Ile  
 50 55 60  
 Lys Val Lys Glu Val Arg Tyr Leu Lys Glu Phe Arg Asn Leu Asn Ser  
 65 70 75 80  
 Lys Asp Ala Arg Glu Tyr Asp Leu Ala Leu Leu Ile Leu Glu Glu Pro  
 85 90 95  
 Ile Gly Ala Lys Leu Gly Thr Leu Gly Leu Pro Thr Ser Gln Lys Asn  
 100 105 110  
 Leu Thr Gly Ile Thr Val Thr Ile Thr Gly Tyr Pro Ser Tyr Asn Phe  
 115 120 125  
 Lys Ile His Gln Met Tyr Thr Asp Lys Lys Gln Val Leu Ser Asp Asp  
 130 135 140  
 Gly Met Phe Leu Asp Tyr Gln Val Asp Thr Leu Glu Gly Ser Ser Gly  
 145 150 155 160  
 Ser Thr Val Tyr Asp Ala Ser His Arg Val Val Gly Val His Thr Leu  
 165 170 175  
 Gly Asp Gly Ala Asn Gln Ile Asn Ser Ala Val Lys Leu Asn Glu Arg  
 180 185 190  
 Asn Leu Pro Phe Ile Tyr Ser Val Leu Lys Gly Tyr Ser Leu Glu Gly  
 195 200 205  
 Trp Lys Lys Ile Asn Gly Ser Trp Tyr His Tyr Arg Gln His Asp Lys  
 210 215 220  
 Gln Thr Gly Trp Gln Glu Ile Asn Asp Thr Trp Tyr Tyr Leu Asp Ser  
 225 230 235 240  
 Ser Gly Lys Met Leu Thr Asp Trp Gln Lys Val Asn Gly Lys Trp Tyr  
 245 250 255  
 Tyr Leu Asn Ser Asn Gly Ala Met Val Thr Gly Ser Gln Thr Ile Asp  
 260 265 270  
 Gly Lys Val Tyr Asn Phe Ala Ser Ser Gly Glu Trp Ile  
 275 280 285

<210> 166  
 <211> 630

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 166

Leu Met Lys Lys Thr Phe Phe Leu Leu Val Leu Gly Leu Phe Cys Leu  
 1 5 10 15

Leu Pro Leu Ser Val Phe Ala Ile Asp Phe Lys Ile Asn Ser Tyr Gln  
 20 25 30

Gly Asp Leu Tyr Ile His Ala Asp Asn Thr Ala Glu Phe Arg Gln Lys  
 35 40 45

Ile Val Tyr Gln Phe Glu Glu Asp Phe Lys Gly Gln Ile Val Gly Leu  
 50 55 60

Gly Arg Ala Gly Lys Met Pro Ser Gly Phe Asp Ile Asp Pro His Pro  
 65 70 75 80

Lys Ile Gln Ala Ala Lys Asn Gly Ala Glu Leu Ala Asp Val Thr Ser  
 85 90 95

Glu Val Thr Glu Glu Ala Asp Gly Tyr Thr Val Arg Val Tyr Asn Pro  
 100 105 110

Gly Gln Glu Gly Asp Ile Val Glu Val Asp Leu Val Trp Asn Leu Lys  
 115 120 125

Asn Leu Leu Phe Leu Tyr Asp Asp Ile Ala Glu Leu Asn Trp Gln Pro  
 130 135 140

Leu Thr Asp Ser Ser Glu Ser Ile Glu Lys Phe Glu Phe His Val Arg  
 145 150 155 160

Gly Asp Lys Gly Ala Glu Lys Leu Phe Phe His Thr Gly Lys Leu Phe  
 165 170 175

Arg Glu Gly Thr Ile Glu Lys Ser Asn Leu Asp Tyr Thr Ile Arg Leu  
 180 185 190

Asp Asn Leu Pro Ala Lys Arg Gly Val Glu Leu His Ala Tyr Trp Pro  
 195 200 205

Arg Thr Asp Phe Ala Ser Ala Arg Asp Gln Gly Leu Lys Gly Asn Arg  
 210 215 220

Leu Glu Glu Phe Asn Lys Ile Glu Asp Ser Ile Val Arg Glu Lys Asp  
 225 230 235 240

1028462\_1.TXT

Gln Ser Lys Gln Leu Val Thr Trp Val Leu Pro Ser Ile Leu Ser Ile  
245 250 255

Ser Leu Leu Leu Ser Val Cys Phe Tyr Phe Ile Tyr Arg Arg Lys Thr  
260 265 270

Thr Pro Ser Val Lys Tyr Ala Lys Asn His Arg Leu Tyr Glu Pro Pro  
275 280 285

Met Glu Leu Glu Pro Met Val Leu Ser Glu Ala Val Tyr Ser Thr Ser  
290 295 300

Leu Glu Glu Val Ser Pro Leu Val Lys Gly Ala Gly Lys Phe Thr Phe  
305 310 315 320

Asp Gln Leu Ile Gln Ala Thr Leu Leu Asp Val Ile Asp Arg Gly Asn  
325 330 335

Val Ser Ile Ile Ser Glu Gly Asp Ala Val Gly Leu Arg Leu Val Lys  
340 345 350

Glu Asp Gly Leu Ser Ser Phe Glu Lys Asp Cys Leu Asn Leu Ala Phe  
355 360 365

Ser Gly Lys Lys Glu Glu Thr Leu Ser Asn Leu Phe Ala Asp Tyr Lys  
370 375 380

Val Ser Asp Ser Leu Tyr Arg Arg Ala Lys Val Ser Asp Glu Lys Arg  
385 390 395 400

Ile Gln Ala Arg Gly Leu Gln Leu Lys Ser Ser Phe Glu Glu Val Leu  
405 410 415

Asn Gln Met Gln Glu Gly Val Arg Lys Arg Val Ser Phe Trp Gly Leu  
420 425 430

Pro Asp Tyr Tyr Arg Pro Leu Thr Gly Gly Glu Lys Ala Leu Gln Val  
435 440 445

Gly Met Gly Ala Leu Thr Ile Leu Pro Leu Phe Ile Gly Phe Gly Leu  
450 455 460

Phe Leu Tyr Ser Leu Asp Val His Gly Tyr Leu Tyr Leu Pro Leu Pro  
465 470 475 480

Ile Leu Gly Phe Leu Gly Leu Val Leu Ser Val Phe Tyr Tyr Trp Lys  
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Leu Arg Leu Asp Asn Arg Asp Gly Val Leu Asn Glu Ala Gly Ala Glu  
500 505 510

Val Tyr Tyr Leu Trp Thr Ser Phe Glu Asn Met Leu Arg Glu Ile Ala  
515 520 525

Arg Leu Asp Gln Ala Glu Leu Glu Ser Ile Val Val Trp Asn Arg Leu  
530 535 540

Leu Val Tyr Ala Thr Leu Phe Gly Tyr Ala Asp Lys Val Ser His Leu  
545 550 555 560

Met Lys Val His Gln Ile Gln Val Glu Asn Pro Asp Ile Asn Leu Tyr  
565 570 575

Val Ala Tyr Gly Trp His Ser Thr Phe Tyr His Ser Thr Ala Gln Met  
580 585 590

Ser His Tyr Ala Ser Val Ala Asn Thr Ala Ser Thr Tyr Ser Val Ser  
595 600 605

Ser Gly Ser Gly Ser Ser Gly Gly Gly Phe Ser Gly Gly Gly Gly Gly  
610 615 620

Gly Ser Ile Gly Ala Phe  
625 630

<210> 167  
<211> 665  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 167

Met Lys Ser Ile Asn Lys Phe Leu Thr Met Leu Ala Ala Leu Leu Leu  
1 5 10 15

Thr Ala Ser Ser Leu Phe Ser Ala Ala Thr Val Phe Ala Ala Gly Thr  
20 25 30

Thr Thr Thr Ser Val Thr Val His Lys Leu Leu Ala Thr Asp Gly Asp  
35 40 45

Met Asp Lys Ile Ala Asn Glu Leu Glu Thr Gly Asn Tyr Ala Gly Asn  
50 55 60

Lys Val Gly Val Leu Pro Ala Asn Ala Lys Glu Ile Ala Gly Val Met

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |    |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|
| 65  |     |     |     |     | 70  |     |     |     |     |     |     |     |     |     |     |  | 80 |
|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |  |    |
| Phe | Val | Trp | Thr | Asn | Thr | Asn | Asn | Glu | Ile | Ile | Asp | Glu | Asn | Gly | Gln |  |    |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |  |    |
| Thr | Leu | Gly | Val | Asn | Ile | Asp | Pro | Gln | Thr | Phe | Lys | Leu | Ser | Gly | Ala |  |    |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |  |    |
| Met | Pro | Ala | Thr | Ala | Met | Lys | Lys | Leu | Thr | Glu | Ala | Glu | Gly | Ala | Lys |  |    |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |  |    |
| Phe | Asn | Thr | Ala | Asn | Leu | Pro | Ala | Ala | Lys | Tyr | Lys | Ile | Tyr | Glu | Ile |  |    |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |  |    |
| His | Ser | Leu | Ser | Thr | Tyr | Val | Gly | Glu | Asp | Gly | Ala | Thr | Leu | Thr | Gly |  |    |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |  |    |
| Ser | Lys | Ala | Val | Pro | Ile | Glu | Ile | Glu | Leu | Pro | Leu | Asn | Asp | Val | Val |  |    |
|     |     |     |     | 165 |     |     |     |     | 170 |     |     |     |     | 175 |     |  |    |
| Asp | Ala | His | Val | Tyr | Pro | Lys | Asn | Thr | Glu | Ala | Lys | Pro | Lys | Ile | Asp |  |    |
|     |     |     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |  |    |
| Lys | Asp | Phe | Lys | Gly | Lys | Ala | Asn | Pro | Asp | Thr | Pro | Arg | Val | Asp | Lys |  |    |
|     |     | 195 |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |  |    |
| Asp | Thr | Pro | Val | Asn | His | Gln | Val | Gly | Asp | Val | Val | Glu | Tyr | Glu | Ile |  |    |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |  |    |
| Val | Thr | Lys | Ile | Pro | Ala | Leu | Ala | Asn | Tyr | Ala | Thr | Ala | Asn | Trp | Ser |  |    |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |  |    |
| Asp | Arg | Met | Thr | Glu | Gly | Leu | Ala | Phe | Asn | Lys | Gly | Thr | Val | Lys | Val |  |    |
|     |     |     |     | 245 |     |     |     |     | 250 |     |     |     |     | 255 |     |  |    |
| Thr | Val | Asp | Asp | Val | Ala | Leu | Glu | Ala | Gly | Asp | Tyr | Ala | Leu | Thr | Glu |  |    |
|     |     |     | 260 |     |     |     |     | 265 |     |     |     |     | 270 |     |     |  |    |
| Val | Ala | Thr | Gly | Phe | Asp | Leu | Lys | Leu | Thr | Asp | Ala | Gly | Leu | Ala | Lys |  |    |
|     |     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |  |    |
| Val | Asn | Asp | Gln | Asn | Ala | Glu | Lys | Thr | Val | Lys | Ile | Thr | Tyr | Ser | Ala |  |    |
|     | 290 |     |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |  |    |
| Thr | Leu | Asn | Asp | Lys | Ala | Ile | Val | Glu | Val | Pro | Glu | Ser | Asn | Asp | Val |  |    |
| 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |  |    |

Thr Phe Asn Tyr Gly Asn Asn Pro Asp His Gly Asn Thr Pro Lys Pro  
 325 330 335  
 Asn Lys Pro Asn Glu Asn Gly Asp Leu Thr Leu Thr Lys Thr Trp Val  
 340 345 350  
 Asp Ala Thr Gly Ala Pro Ile Pro Ala Gly Ala Glu Ala Thr Phe Asp  
 355 360 365  
 Leu Val Asn Ala Gln Thr Gly Lys Val Val Gln Thr Val Thr Leu Thr  
 370 375 380  
 Thr Asp Lys Asn Thr Val Thr Val Asn Gly Leu Asp Lys Asn Thr Glu  
 385 390 395 400  
 Tyr Lys Phe Val Glu Arg Ser Ile Lys Gly Tyr Ser Ala Asp Tyr Gln  
 405 410 415  
 Glu Ile Thr Thr Ala Gly Glu Ile Ala Val Lys Asn Trp Lys Asp Glu  
 420 425 430  
 Asn Pro Lys Pro Leu Asp Pro Thr Glu Pro Lys Val Val Thr Tyr Gly  
 435 440 445  
 Lys Lys Phe Val Lys Val Asn Asp Lys Asp Asn Arg Leu Ala Gly Ala  
 450 455 460  
 Glu Phe Val Ile Ala Asn Ala Asp Asn Ala Gly Gln Tyr Leu Ala Arg  
 465 470 475 480  
 Lys Ala Asp Lys Val Ser Gln Glu Glu Lys Gln Leu Val Val Thr Thr  
 485 490 495  
 Lys Asp Ala Leu Asp Arg Ala Val Ala Ala Tyr Asn Ala Leu Thr Ala  
 500 505 510  
 Gln Gln Gln Thr Gln Gln Glu Lys Glu Lys Val Asp Lys Ala Gln Ala  
 515 520 525  
 Ala Tyr Asn Ala Ala Val Ile Ala Ala Asn Asn Ala Phe Glu Trp Val  
 530 535 540  
 Ala Asp Lys Asp Asn Glu Asn Val Val Lys Leu Val Ser Asp Ala Gln  
 545 550 555 560  
 Gly Arg Phe Glu Ile Thr Gly Leu Leu Ala Gly Thr Tyr Tyr Leu Glu  
 565 570 575

1028462\_1.TXT

Glu Thr Lys Gln Pro Ala Gly Tyr Ala Leu Leu Thr Ser Arg Gln Lys  
580 585 590

Phe Glu Val Thr Ala Thr Ser Tyr Ser Ala Thr Gly Gln Gly Ile Glu  
595 600 605

Tyr Thr Ala Gly Ser Gly Lys Asp Asp Ala Thr Lys Val Val Asn Lys  
610 615 620

Lys Ile Thr Ile Pro Gln Thr Gly Gly Ile Gly Thr Ile Ile Phe Ala  
625 630 635 640

Val Ala Gly Ala Ala Ile Met Gly Ile Ala Val Tyr Ala Tyr Val Lys  
645 650 655

Asn Asn Lys Asp Glu Asp Gln Leu Ala  
660 665

<210> 168  
<211> 279  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 168

Met Ala Val Met Ala Tyr Pro Leu Val Ser Arg Leu Tyr Tyr Arg Val  
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Glu Ser Asn Gln Gln Ile Ala Asp Phe Asp Lys Glu Lys Ala Thr Leu  
20 25 30

Asp Glu Ala Asp Ile Asp Glu Arg Met Lys Leu Ala Gln Ala Phe Asn  
35 40 45

Asp Ser Leu Asn Asn Val Val Ser Gly Asp Pro Trp Ser Glu Glu Met  
50 55 60

Lys Lys Lys Gly Arg Ala Glu Tyr Ala Arg Met Leu Glu Ile His Glu  
65 70 75 80

Arg Met Gly His Val Glu Ile Pro Val Ile Asp Val Asp Leu Pro Val  
85 90 95

Tyr Ala Gly Thr Ala Glu Glu Val Leu Gln Gln Gly Ala Gly His Leu  
100 105 110

Glu Gly Thr Ser Leu Pro Ile Gly Gly Asn Ser Thr His Ala Val Ile  
115 120 125

1028462\_1.TXT

Thr Ala His Thr Gly Leu Pro Thr Ala Lys Met Phe Thr Asp Leu Thr  
130 135 140

Lys Leu Lys Val Gly Asp Lys Phe Tyr Val His Asn Ile Lys Glu Val  
145 150 155 160

Met Ala Tyr Gln Val Asp Gln Val Lys Val Ile Glu Pro Thr Asn Phe  
165 170 175

Asp Asp Leu Leu Ile Val Pro Gly His Asp Tyr Val Thr Leu Leu Thr  
180 185 190

Cys Thr Pro Tyr Met Ile Asn Thr His Arg Leu Leu Val Arg Gly His  
195 200 205

Arg Ile Pro Tyr Val Ala Glu Val Glu Glu Glu Phe Ile Ala Ala Asn  
210 215 220

Lys Leu Ser His Leu Tyr Arg Tyr Leu Phe Tyr Val Ala Val Gly Leu  
225 230 235 240

Ile Val Ile Leu Leu Trp Ile Ile Arg Arg Leu Arg Lys Lys Lys Lys  
245 250 255

Gln Pro Glu Lys Ala Leu Lys Ala Leu Lys Ala Ala Arg Lys Glu Val  
260 265 270

Lys Val Glu Asp Gly Gln Gln  
275

<210> 169  
<211> 283  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 169

Met Ser Arg Thr Lys Leu Arg Ala Leu Leu Gly Tyr Leu Leu Met Leu  
1 5 10 15

Val Ala Cys Leu Ile Pro Ile Tyr Cys Phe Gly Gln Met Val Leu Gln  
20 25 30

Ser Leu Gly Gln Val Lys Gly His Ala Thr Phe Val Lys Ser Met Thr  
35 40 45

Thr Glu Met Tyr Gln Glu Gln Gln Asn His Ser Leu Ala Tyr Asn Gln  
50 55 60



1028462\_1.TXT

Arg Leu Ala Ser Gln Asn Arg Ile Val Asp Pro Phe Leu Ala Glu Gly  
65 70 75 80

Tyr Glu Val Asn Tyr Gln Val Ser Asp Asp Pro Asp Ala Val Tyr Gly  
85 90 95

Tyr Leu Ser Ile Pro Ser Leu Glu Ile Met Glu Pro Val Tyr Leu Gly  
100 105 110

Ala Asp Tyr His His Leu Gly Met Gly Leu Ala His Val Asp Gly Thr  
115 120 125

Pro Leu Pro Leu Asp Gly Thr Gly Ile Arg Ser Val Ile Ala Gly His  
130 135 140

Arg Ala Glu Pro Ser His Val Phe Phe Arg His Leu Asp Gln Leu Lys  
145 150 155 160

Val Gly Asp Ala Leu Tyr Tyr Asp Asn Gly Gln Glu Ile Val Glu Tyr  
165 170 175

Gln Met Met Asp Thr Glu Ile Ile Leu Pro Ser Glu Trp Glu Lys Leu  
180 185 190

Glu Ser Val Ser Ser Lys Asn Ile Met Thr Leu Ile Thr Cys Asp Pro  
195 200 205

Ile Pro Thr Phe Asn Lys Arg Leu Leu Val Asn Phe Glu Arg Val Ala  
210 215 220

Val Tyr Gln Lys Ser Asp Pro Gln Thr Ala Ala Val Ala Arg Val Ala  
225 230 235 240

Phe Thr Lys Glu Gly Gln Ser Val Ser Arg Val Ala Thr Ser Gln Trp  
245 250 255

Leu Tyr Arg Gly Leu Val Val Leu Ala Phe Leu Gly Ile Leu Phe Val  
260 265 270

Leu Trp Lys Leu Ala Arg Leu Leu Arg Gly Lys  
275 280

<210> 170  
<211> 1659  
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<213> Streptococcus pneumoniae  
<400> 170

## 1028462\_1.TXT

Met Lys Asn Pro Phe Phe Glu Arg Arg Cys Arg Tyr Ser Ile Arg Lys  
 1 5 10 15  
 Leu Ser Val Gly Ala Cys Ser Leu Met Ile Gly Ala Val Leu Phe Ala  
 20 25 30  
 Gly Pro Ala Leu Ala Glu Glu Thr Ala Val Pro Glu Asn Ser Gly Ala  
 35 40 45  
 Asn Thr Glu Leu Val Ser Gly Glu Ser Glu His Ser Thr Asn Glu Ala  
 50 55 60  
 Asp Lys Gln Asn Glu Gly Glu His Ala Arg Glu Asn Lys Leu Glu Lys  
 65 70 75 80  
 Ala Glu Gly Val Ala Ile Ala Ser Glu Thr Ala Ser Pro Ala Ser Asn  
 85 90 95  
 Glu Ala Ala Thr Thr Glu Thr Ala Glu Ala Ala Ser Ala Ala Lys Pro  
 100 105 110  
 Glu Glu Lys Ala Ser Glu Val Val Ala Glu Thr Pro Ser Ala Glu Ala  
 115 120 125  
 Lys Pro Lys Ser Asp Lys Glu Thr Glu Ala Lys Pro Glu Ala Thr Asn  
 130 135 140  
 Gln Gly Asp Glu Ser Lys Pro Ala Ala Glu Ala Asn Lys Thr Glu Lys  
 145 150 155 160  
 Glu Val Gln Pro Asp Val Pro Lys Asn Thr Glu Lys Thr Leu Lys Pro  
 165 170 175  
 Lys Glu Ile Lys Phe Asn Ser Trp Glu Glu Leu Leu Lys Trp Glu Pro  
 180 185 190  
 Gly Ala Arg Glu Asp Asp Ala Ile Asn Arg Gly Ser Val Val Leu Ala  
 195 200 205  
 Ser Arg Arg Thr Gly His Leu Val Asn Glu Lys Ala Ser Lys Glu Ala  
 210 215 220  
 Lys Val Gln Ala Leu Ser Asn Thr Asn Ser Lys Ala Lys Asp His Ala  
 225 230 235 240  
 Ser Val Gly Gly Glu Glu Phe Lys Ala Tyr Ala Phe Asp Tyr Trp Gln  
 245 250 255

1028462\_1.TXT

Tyr Leu Asp Ser Met Val Phe Trp Glu Gly Leu Val Pro Thr Pro Asp  
 260 265 270  
 Val Ile Asp Ala Gly His Arg Asn Gly Val Pro Val Tyr Gly Thr Leu  
 275 280 285  
 Phe Phe Asn Trp Ser Asn Ser Ile Ala Asp Gln Glu Arg Phe Ala Glu  
 290 295 300  
 Ala Leu Lys Gln Asp Ala Asp Gly Ser Phe Pro Ile Ala Arg Lys Leu  
 305 310 315 320  
 Val Asp Met Ala Lys Tyr Tyr Gly Tyr Asp Gly Tyr Phe Ile Asn Gln  
 325 330 335  
 Glu Thr Thr Gly Asp Leu Val Lys Pro Leu Gly Glu Lys Met Arg Gln  
 340 345 350  
 Phe Met Leu Tyr Ser Lys Glu Tyr Ala Ala Lys Val Asn His Pro Ile  
 355 360 365  
 Lys Tyr Ser Trp Tyr Asp Ala Met Thr Tyr Asn Tyr Gly Arg Tyr His  
 370 375 380  
 Gln Asp Gly Leu Gly Glu Tyr Asn Tyr Gln Phe Met Gln Pro Glu Gly  
 385 390 395 400  
 Asp Lys Val Pro Ala Asp Asn Phe Phe Ala Asn Phe Asn Trp Asp Lys  
 405 410 415  
 Ala Lys Asn Asp Tyr Thr Ile Ala Thr Ala Asn Trp Ile Gly Arg Asn  
 420 425 430  
 Pro Tyr Asp Val Phe Ala Gly Leu Glu Leu Gln Gln Gly Gly Ser Tyr  
 435 440 445  
 Lys Thr Lys Val Lys Trp Asn Asp Ile Leu Asp Glu Asn Gly Lys Leu  
 450 455 460  
 Arg Leu Ser Leu Gly Leu Phe Ala Pro Asp Thr Ile Thr Ser Leu Gly  
 465 470 475 480  
 Lys Thr Gly Glu Asp Tyr His Lys Asn Glu Asp Ile Phe Phe Thr Gly  
 485 490 495  
 Tyr Gln Gly Asp Pro Thr Gly Gln Lys Pro Gly Asp Lys Asp Trp Tyr

500 505 510  
 Gly Ile Ala Asn Leu Val Ala Asp Arg Thr Pro Ala Val Gly Asn Thr  
 515 520 525  
 Phe Thr Thr Ser Phe Asn Thr Gly His Gly Lys Lys Trp Phe Val Asp  
 530 535 540  
 Gly Lys Val Ser Lys Asp Ser Glu Trp Asn Tyr Arg Ser Val Ser Gly  
 545 550 555 560  
 Val Leu Pro Thr Trp Arg Trp Trp Gln Thr Ser Thr Gly Glu Lys Leu  
 565 570 575  
 Arg Ala Glu Tyr Asp Phe Thr Asp Ala Tyr Asn Gly Gly Asn Ser Leu  
 580 585 590  
 Lys Phe Ser Gly Asp Val Ala Gly Lys Thr Asp Gln Asp Val Arg Leu  
 595 600 605  
 Tyr Ser Thr Lys Leu Glu Val Thr Glu Lys Thr Lys Leu Arg Val Ala  
 610 615 620  
 His Lys Gly Gly Lys Gly Ser Lys Val Tyr Met Ala Phe Ser Thr Thr  
 625 630 635 640  
 Pro Asp Tyr Lys Phe Asp Asp Ala Asp Ala Trp Lys Glu Leu Thr Leu  
 645 650 655  
 Ser Asp Asn Trp Thr Asn Glu Glu Phe Asp Leu Ser Ser Leu Ala Gly  
 660 665 670  
 Lys Thr Ile Tyr Ala Val Lys Leu Phe Phe Glu His Glu Gly Ala Val  
 675 680 685  
 Lys Asp Tyr Gln Phe Asn Leu Gly Gln Leu Thr Ile Ser Asp Asn His  
 690 695 700  
 Gln Glu Pro Gln Ser Pro Thr Ser Phe Ser Val Val Lys Gln Ser Leu  
 705 710 715 720  
 Lys Asn Ala Gln Glu Ala Glu Ala Val Val Gln Phe Lys Gly Asn Lys  
 725 730 735  
 Asp Ala Asp Phe Tyr Glu Val Tyr Glu Lys Asp Gly Asp Ser Trp Lys  
 740 745 750

## 1028462\_1.TXT

Leu Leu Thr Gly Ser Ser Ser Thr Thr Ile Tyr Leu Pro Lys Val Ser  
 755 760 765  
 Arg Ser Ala Ser Ala Gln Gly Thr Thr Gln Glu Leu Lys Val Val Ala  
 770 775 780  
 Val Gly Lys Asn Gly Val Arg Ser Glu Ala Ala Thr Thr Thr Phe Asp  
 785 790 795 800  
 Trp Gly Met Thr Val Lys Asp Thr Ser Leu Pro Lys Pro Leu Ala Glu  
 805 810 815  
 Asn Ile Val Pro Gly Ala Thr Val Ile Asp Ser Thr Phe Pro Lys Thr  
 820 825 830  
 Glu Gly Gly Glu Gly Ile Glu Gly Met Leu Asn Gly Thr Ile Thr Ser  
 835 840 845  
 Leu Ser Asp Lys Trp Ser Ser Ala Gln Leu Ser Gly Ser Val Asp Ile  
 850 855 860  
 Arg Leu Thr Lys Pro Arg Thr Val Val Arg Trp Val Met Asp His Ala  
 865 870 875 880  
 Gly Ala Gly Gly Glu Ser Val Asn Asp Gly Leu Met Asn Thr Lys Asp  
 885 890 895  
 Phe Asp Leu Tyr Tyr Lys Asp Ala Asp Gly Glu Trp Lys Leu Ala Lys  
 900 905 910  
 Glu Val Arg Gly Asn Lys Ala His Val Thr Asp Ile Thr Leu Asp Lys  
 915 920 925  
 Pro Ile Thr Ala Gln Asp Trp Arg Leu Asn Val Val Thr Ser Asp Asn  
 930 935 940  
 Gly Thr Pro Trp Lys Ala Ile Arg Ile Tyr Asn Trp Lys Met Tyr Glu  
 945 950 955 960  
 Lys Leu Asp Thr Glu Ser Val Asn Ile Pro Met Ala Lys Ala Ala Ala  
 965 970 975  
 Arg Ser Leu Gly Asn Asn Lys Val Gln Val Gly Phe Ala Asp Val Pro  
 980 985 990  
 Ala Gly Ala Thr Ile Thr Val Tyr Asp Asn Pro Asn Ser Gln Thr Pro  
 995 1000 1005

## 1028462\_1.TXT

|     |      |     |     |     |     |      |     |     |     |     |      |     |     |     |
|-----|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Leu | Ala  | Thr | Leu | Lys | Ser | Glu  | Val | Gly | Gly | Asp | Leu  | Ala | Ser | Ala |
|     | 1010 |     |     |     |     | 1015 |     |     |     |     | 1020 |     |     |     |
| Pro | Leu  | Asp | Leu | Thr | Asn | Gln  | Ser | Gly | Leu | Leu | Tyr  | Tyr | Arg | Thr |
|     | 1025 |     |     |     |     | 1030 |     |     |     |     | 1035 |     |     |     |
| Gln | Leu  | Pro | Gly | Lys | Glu | Ile  | Ser | Asn | Val | Leu | Ala  | Val | Ser | Val |
|     | 1040 |     |     |     |     | 1045 |     |     |     |     | 1050 |     |     |     |
| Pro | Lys  | Asp | Asp | Arg | Arg | Ile  | Lys | Ser | Val | Ser | Leu  | Glu | Thr | Gly |
|     | 1055 |     |     |     |     | 1060 |     |     |     |     | 1065 |     |     |     |
| Pro | Lys  | Lys | Thr | Ser | Tyr | Ala  | Glu | Gly | Glu | Asp | Leu  | Asp | Leu | Arg |
|     | 1070 |     |     |     |     | 1075 |     |     |     |     | 1080 |     |     |     |
| Gly | Gly  | Val | Leu | Arg | Val | Gln  | Tyr | Glu | Gly | Gly | Thr  | Glu | Asp | Glu |
|     | 1085 |     |     |     |     | 1090 |     |     |     |     | 1095 |     |     |     |
| Leu | Ile  | Arg | Leu | Thr | His | Ala  | Gly | Val | Ser | Val | Ser  | Gly | Phe | Asp |
|     | 1100 |     |     |     |     | 1105 |     |     |     |     | 1110 |     |     |     |
| Thr | His  | His | Lys | Gly | Glu | Gln  | Asn | Leu | Thr | Leu | Gln  | Tyr | Leu | Gly |
|     | 1115 |     |     |     |     | 1120 |     |     |     |     | 1125 |     |     |     |
| Gln | Pro  | Val | Asn | Ala | Asn | Leu  | Ser | Val | Thr | Val | Thr  | Gly | Gln | Asp |
|     | 1130 |     |     |     |     | 1135 |     |     |     |     | 1140 |     |     |     |
| Glu | Ala  | Ser | Pro | Lys | Thr | Ile  | Leu | Gly | Ile | Glu | Val  | Ser | Gln | Glu |
|     | 1145 |     |     |     |     | 1150 |     |     |     |     | 1155 |     |     |     |
| Pro | Lys  | Lys | Asp | Tyr | Leu | Val  | Gly | Asp | Ser | Leu | Asp  | Leu | Ser | Glu |
|     | 1160 |     |     |     |     | 1165 |     |     |     |     | 1170 |     |     |     |
| Gly | Arg  | Phe | Ala | Val | Ala | Tyr  | Ser | Asn | Asp | Thr | Met  | Glu | Glu | His |
|     | 1175 |     |     |     |     | 1180 |     |     |     |     | 1185 |     |     |     |
| Ser | Phe  | Thr | Asp | Glu | Gly | Val  | Glu | Ile | Ser | Gly | Tyr  | Asp | Ala | Gln |
|     | 1190 |     |     |     |     | 1195 |     |     |     |     | 1200 |     |     |     |
| Lys | Thr  | Gly | Arg | Gln | Thr | Leu  | Thr | Leu | His | Tyr | Gln  | Gly | His | Glu |
|     | 1205 |     |     |     |     | 1210 |     |     |     |     | 1215 |     |     |     |
| Val | Ser  | Phe | Asp | Val | Leu | Val  | Ser | Pro | Lys | Ala | Ala  | Leu | Asn | Asp |
|     | 1220 |     |     |     |     | 1225 |     |     |     |     | 1230 |     |     |     |
| Glu | Tyr  | Leu | Lys | Gln | Lys | Leu  | Ala | Glu | Val | Glu | Ala  | Ala | Lys | Asn |
|     | 1235 |     |     |     |     | 1240 |     |     |     |     | 1245 |     |     |     |

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Lys Val Val Tyr Asn Phe Ala Ser Ser Glu Val Lys Glu Ala Phe  
 1250 1255 1260  
 Leu Lys Ala Ile Glu Ala Ala Glu Gln Val Leu Lys Asp His Glu  
 1265 1270 1275  
 Thr Ser Thr Gln Asp Gln Val Asn Asp Arg Leu Asn Lys Leu Thr  
 1280 1285 1290  
 Glu Ala His Lys Ala Leu Asn Gly Gln Glu Lys Phe Thr Glu Glu  
 1295 1300 1305  
 Lys Thr Glu Leu Asp Arg Leu Thr Gly Glu Val Gln Glu Leu Leu  
 1310 1315 1320  
 Ala Ala Lys Pro Asn His Pro Ser Gly Ser Ala Leu Ala Pro Leu  
 1325 1330 1335  
 Leu Glu Lys Asn Lys Ala Leu Val Glu Lys Val Asp Leu Ser Pro  
 1340 1345 1350  
 Glu Glu Leu Thr Thr Ala Lys Gln Ser Leu Lys Asp Leu Val Ala  
 1355 1360 1365  
 Leu Leu Lys Glu Asp Lys Pro Ala Val Phe Ser Asp Ser Lys Thr  
 1370 1375 1380  
 Gly Val Glu Val His Phe Ser Asn Lys Glu Lys Thr Val Ile Lys  
 1385 1390 1395  
 Gly Leu Lys Val Glu Arg Val Gln Ala Ser Ala Glu Glu Lys Lys  
 1400 1405 1410  
 Tyr Phe Ala Gly Glu Asp Ala His Val Phe Glu Ile Glu Gly Leu  
 1415 1420 1425  
 Asp Glu Lys Gly Gln Asp Val Asp Leu Ser Tyr Ala Ser Ile Val  
 1430 1435 1440  
 Lys Ile Pro Ile Glu Lys Asp Lys Lys Val Lys Lys Val Phe Phe  
 1445 1450 1455  
 Leu Pro Glu Gly Lys Glu Ala Val Glu Leu Ala Phe Glu Gln Thr  
 1460 1465 1470  
 Asp Ser His Val Ile Phe Thr Ala Pro His Phe Thr His Tyr Ala

1475

1480

1485

Phe Val Tyr Glu Ser Ala Glu Lys Pro Gln Pro Ala Lys Pro Ala  
 1490 1495 1500

Pro Gln Asn Thr Val Leu Pro Lys Pro Thr Tyr Gln Pro Thr Ser  
 1505 1510 1515

Asp Gln Gln Lys Ala Pro Lys Leu Glu Val Gln Glu Glu Lys Val  
 1520 1525 1530

Ala Phe His Arg Gln Glu His Glu Asn Thr Glu Met Leu Val Gly  
 1535 1540 1545

Glu Gln Arg Val Ile Ile Gln Gly Arg Asp Gly Leu Leu Arg His  
 1550 1555 1560

Val Phe Glu Val Asp Glu Asn Gly Gln Arg Arg Leu Arg Ser Thr  
 1565 1570 1575

Glu Val Ile Gln Glu Ala Ile Pro Glu Ile Val Glu Ile Gly Thr  
 1580 1585 1590

Lys Val Lys Thr Val Pro Ala Val Val Ala Thr Gln Glu Lys Pro  
 1595 1600 1605

Ala Gln Asn Thr Ala Val Lys Ser Glu Glu Ala Ser Lys Gln Leu  
 1610 1615 1620

Pro Asn Thr Gly Thr Ala Asp Ala Asn Glu Ala Leu Ile Ala Gly  
 1625 1630 1635

Leu Ala Ser Leu Gly Leu Ala Ser Leu Ala Leu Thr Leu Arg Arg  
 1640 1645 1650

Lys Arg Glu Asp Lys Asp  
 1655

<210> 171  
 <211> 487  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 171

Met Ser Ile Thr Ser Phe Val Lys Arg Ile Gln Asp Ile Thr Arg Asn  
 1 5 10 15

Asp Ala Gly Val Asn Gly Asp Ala Gln Arg Ile Glu Gln Met Ser Trp  
 Page 180



20

25

30

Leu Leu Phe Leu Lys Ile Tyr Asp Ser Arg Glu Met Val Trp Glu Leu  
 35 40 45  
 Glu Glu Asp Glu Tyr Glu Ser Ile Ile Pro Glu Glu Leu Lys Trp Arg  
 50 55 60  
 Asn Trp Ala His Ala Gln Asn Gly Glu Arg Val Leu Thr Gly Asp Glu  
 65 70 75 80  
 Leu Leu Asp Phe Val Asn Asn Lys Leu Phe Lys Glu Leu Lys Glu Leu  
 85 90 95  
 Glu Ile Thr Ser Asn Met Pro Ile Arg Lys Thr Ile Val Lys Ser Ala  
 100 105 110  
 Phe Glu Asp Ala Asn Asn Tyr Met Lys Asn Gly Val Leu Leu Arg Gln  
 115 120 125  
 Val Ile Asn Val Ile Asp Glu Val Asp Phe Asn Ser Pro Glu Asp Arg  
 130 135 140  
 His Ser Phe Asn Asp Ile Tyr Glu Lys Ile Leu Lys Asp Ile Gln Asn  
 145 150 155 160  
 Ala Gly Asn Ser Gly Glu Phe Tyr Thr Pro Arg Ala Ala Thr Asp Phe  
 165 170 175  
 Ile Ala Glu Val Leu Asp Pro Lys Leu Gly Glu Ser Met Ala Asp Leu  
 180 185 190  
 Ala Cys Gly Thr Gly Gly Phe Leu Thr Ser Thr Leu Asn Arg Leu Ser  
 195 200 205  
 Ser Gln Arg Lys Thr Ser Glu Asp Thr Lys Lys Tyr Asn Thr Ala Val  
 210 215 220  
 Phe Gly Ile Glu Lys Lys Ala Phe Pro His Leu Leu Ala Val Thr Asn  
 225 230 235 240  
 Leu Phe Leu His Glu Ile Asp Asp Pro Lys Ile Val His Gly Asn Thr  
 245 250 255  
 Leu Glu Lys Asn Val Arg Glu Tyr Thr Asp Asp Glu Lys Phe Asp Ile  
 260 265 270

1028462\_1.TXT

Ile Met Met Asn Pro Pro Phe Gly Gly Ser Glu Leu Glu Thr Ile Lys  
275 280 285

Asn Asn Phe Pro Ala Glu Leu Arg Ser Ser Glu Thr Ala Asp Leu Phe  
290 295 300

Met Ala Val Ile Met Tyr Arg Leu Lys Glu Asn Gly Arg Val Gly Val  
305 310 315 320

Ile Leu Pro Asp Gly Phe Leu Phe Gly Glu Gly Val Lys Thr Arg Leu  
325 330 335

Lys Gln Lys Leu Val Asp Glu Phe Asn Leu His Thr Ile Ile Arg Leu  
340 345 350

Pro His Ser Val Phe Ala Pro Tyr Thr Gly Ile His Thr Asn Ile Leu  
355 360 365

Phe Phe Asp Lys Thr Lys Lys Thr Glu Glu Thr Trp Phe Tyr Arg Leu  
370 375 380

Asp Met Pro Asp Gly Tyr Lys Asn Phe Ser Lys Thr Lys Pro Met Lys  
385 390 395 400

Ser Glu His Phe Asn Pro Val Arg Asp Trp Trp Glu Asn Arg Glu Glu  
405 410 415

Ile Leu Glu Gly Lys Phe Tyr Lys Ser Lys Ser Phe Thr Pro Ser Glu  
420 425 430

Leu Ala Glu Leu Asn Tyr Asn Leu Asp Gln Cys Asp Phe Pro Lys Glu  
435 440 445

Glu Glu Glu Ile Leu Asn Pro Phe Glu Leu Ile Gln Asn Tyr Gln Ala  
450 455 460

Glu Arg Ala Thr Leu Asn His Lys Ile Asp Asn Val Leu Ala Asp Ile  
465 470 475 480

Leu Gln Leu Leu Glu Asp Lys  
485

<210> 172  
<211> 378  
<212> PRT  
<213> Streptococcus pneumoniae  
<400> 172

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Met Asn Asn Thr Glu Phe Tyr Asp Arg Leu Gly Val Ser Lys Asn Ala  
 1 5 10 15  
 Ser Ala Asp Glu Ile Lys Lys Ala Tyr Arg Lys Leu Ser Lys Lys Tyr  
 20 25 30  
 His Pro Asp Ile Asn Lys Glu Pro Gly Ala Glu Asp Lys Tyr Lys Glu  
 35 40 45  
 Val Gln Glu Ala Tyr Glu Thr Leu Ser Asp Asp Gln Lys Arg Ala Ala  
 50 55 60  
 Tyr Asp Gln Tyr Gly Ala Ala Gly Ala Asn Gly Gly Phe Gly Gly Ala  
 65 70 75 80  
 Gly Gly Phe Gly Gly Phe Asn Gly Ala Gly Gly Phe Gly Gly Phe Glu  
 85 90 95  
 Asp Ile Phe Ser Ser Phe Phe Gly Gly Gly Gly Ser Ser Arg Asn Pro  
 100 105 110  
 Asn Ala Pro Arg Gln Gly Asp Asp Leu Gln Tyr Arg Val Asn Leu Thr  
 115 120 125  
 Phe Glu Glu Ala Ile Phe Gly Thr Glu Lys Glu Val Lys Tyr His Arg  
 130 135 140  
 Glu Ala Gly Cys Arg Thr Cys Asn Gly Ser Gly Ala Lys Pro Gly Thr  
 145 150 155 160  
 Ser Pro Val Thr Cys Gly Arg Cys His Gly Ala Gly Val Ile Asn Val  
 165 170 175  
 Asp Thr Gln Thr Pro Leu Gly Met Met Arg Arg Gln Val Thr Cys Asp  
 180 185 190  
 Val Cys His Gly Arg Gly Lys Glu Ile Lys Tyr Pro Cys Thr Thr Cys  
 195 200 205  
 His Gly Thr Gly His Glu Lys Gln Ala His Ser Val His Val Lys Ile  
 210 215 220  
 Pro Ala Gly Val Glu Thr Gly Gln Gln Ile Arg Leu Ala Gly Gln Gly  
 225 230 235 240  
 Glu Ala Gly Phe Asn Gly Gly Pro Tyr Gly Asp Leu Tyr Val Val Val  
 245 250 255

1028462\_1.TXT

Ser Val Glu Ala Ser Asp Lys Phe Glu Arg Glu Gly Thr Thr Ile Phe  
260 265 270

Tyr Asn Leu Asn Leu Asn Phe Val Gln Ala Ala Leu Gly Asp Thr Val  
275 280 285

Asp Ile Pro Thr Val His Gly Asp Val Glu Leu Val Ile Pro Glu Gly  
290 295 300

Thr Gln Thr Gly Lys Lys Phe Arg Leu Arg Ser Lys Gly Ala Pro Ser  
305 310 315 320

Leu Arg Gly Gly Ala Val Gly Asp Gln Tyr Val Thr Val Asn Val Val  
325 330 335

Thr Pro Thr Gly Leu Asn Asp Arg Gln Lys Val Ala Leu Lys Glu Phe  
340 345 350

Ala Ala Ala Gly Asp Leu Lys Val Asn Pro Lys Lys Lys Gly Phe Phe  
355 360 365

Asp His Ile Lys Asp Ala Phe Asp Gly Glu  
370 375

<210> 173  
<211> 453  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 173

Met Asn Pro Asn Leu Phe Arg Ser Val Glu Phe Tyr Gln Arg Arg Tyr  
1 5 10 15

His Asn Tyr Ala Thr Val Leu Ile Ile Pro Leu Ser Leu Leu Phe Thr  
20 25 30

Phe Ile Leu Ile Phe Ser Leu Val Ala Thr Lys Glu Ile Thr Val Thr  
35 40 45

Ser Gln Gly Glu Ile Ala Pro Thr Ser Val Ile Ala Ser Ile Gln Ser  
50 55 60

Thr Ser Asp Asn Pro Ile Leu Ala Asn His Leu Val Ala Asn Gln Val  
65 70 75 80

Val Glu Lys Gly Asp Leu Leu Ile Lys Tyr Ser Glu Thr Met Glu Glu  
85 90 95

## 1028462\_1.TXT

Ser Gln Lys Thr Ala Leu Ala Thr Gln Leu Gln Arg Leu Glu Lys Gln  
 100 105 110  
 Lys Glu Gly Leu Gly Ile Leu Lys Gln Ser Leu Glu Lys Ala Thr Asp  
 115 120 125  
 Leu Phe Ser Gly Glu Asp Glu Phe Gly Tyr His Asn Thr Phe Met Asn  
 130 135 140  
 Phe Thr Lys Gln Ser His Asp Ile Glu Leu Gly Ile Thr Lys Thr Asn  
 145 150 155 160  
 Thr Glu Val Ser Asn Gln Ala Asn Leu Ser Asn Ser Ser Ser Ser Ala  
 165 170 175  
 Ile Glu Gln Glu Ile Thr Lys Val Gln Gln Gln Ile Gly Glu Tyr Gln  
 180 185 190  
 Glu Leu Arg Asp Ala Ile Ile Asn Asn Arg Ala Arg Leu Pro Thr Gly  
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 Asn Pro His Gln Ser Ile Leu Asn Arg Tyr Leu Val Ala Ser Gln Gly  
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Thr Thr Ile Ile Gly Gln Leu Gln Thr Ile Asp Gln Thr Pro Thr Arg  
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Thr Glu Gln Gly Asn Leu Phe Lys Leu Thr Ala Leu Ala Lys Leu Ser  
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Asn Glu Asp Ser Lys Leu Ile Gln Tyr Gly Leu Gln Gly Arg Val Thr  
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Ser Ala Ser Asp Phe Lys Asn Trp Thr Glu Lys Glu Leu Leu Ala Leu  
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Leu Leu Asp Asn Glu Gln Val Asp Met Asp Ile Ala Thr Phe Thr Ile  
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Thr Asp Glu Arg Lys Lys Leu Tyr Asn Phe Thr Ser Pro Tyr Tyr Thr  
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Asp Ala Ser Gly Phe Leu Val Asn Lys Ser Ala Lys Ile Lys Lys Ile  
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Glu Asp Leu Asn Gly Lys Thr Ile Gly Val Ala Gln Gly Ser Ile Thr  
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Gln Arg Leu Ile Thr Glu Leu Gly Lys Lys Lys Gly Leu Lys Phe Lys  
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Phe Val Glu Leu Gly Ser Tyr Pro Glu Leu Ile Thr Ser Leu His Ala  
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Glu Leu Ala Lys Leu Phe Val Lys Gly Asn Asp Ala Val Lys Lys Phe  
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Gly Ile Val Leu Lys Thr Ser Glu Gly Ser Ile Val Tyr Thr Gly Asp  
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 Asn Glu Ile Leu Leu Ile Lys Pro Lys Asp Met Ser Arg Phe Glu Asp  
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 His Glu Leu Ile Ile Leu Glu Thr Gly Arg Met Gly Glu Pro Ile Asn  
 290 295 300  
 Gly Leu Arg Lys Met Ser Ile Gly Arg His Arg Tyr Val Glu Ile Lys  
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 Asp Gly Asp Leu Val Tyr Ile Ala Thr Ala Pro Ser Ile Ala Lys Glu  
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 Val Lys Leu Ile Thr Gln Ser Leu His Val Ser Gly His Gly Asn Val  
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 Arg Asp Leu Gln Leu Met Ile Asn Leu Leu Gln Pro Lys Tyr Leu Phe  
 370 375 380  
 Pro Val Gln Gly Glu Tyr Arg Glu Leu Asp Ala His Ala Lys Ala Ala  
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Met Ala Val Gly Met Leu Pro Glu Arg Ile Phe Ile Pro Lys Lys Gly  
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405

415

Thr Thr Met Ala Tyr Glu Asn Gly Asp Phe Val Pro Ala Gly Ser Val  
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Ser Ala Gly Asp Ile Leu Ile Asp Gly Asn Ala Ile Gly Asp Val Gly  
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Leu Gln Gly Asp Asp Phe Asp Trp Ala Asp Leu Lys Gly Lys Val Arg  
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Glu Lys His Glu Asn Ile His Ser Ala Met Glu Thr Ser Gln Asp Phe  
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Lys Glu Lys Lys Thr Ala Val Ile Lys Glu Lys Glu Val Val Ser Lys

|            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
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| Asn        | Pro        | Val        | Ile        | Asp<br>85  | Asn        | Asn        | Thr        | Ser        | Asn<br>90  | Glu        | Glu        | Ala        | Lys        | Ile<br>95  | Lys        |
| Glu        | Glu        | Asn        | Ser<br>100 | Asn        | Lys        | Ser        | Gln        | Gly<br>105 | Asp        | Tyr        | Thr        | Asp        | Ser<br>110 | Phe        | Val        |
| Asn        | Lys        | Asn<br>115 | Thr        | Glu        | Asn        | Pro        | Lys<br>120 | Lys        | Glu        | Asp        | Lys        | Val<br>125 | Val        | Tyr        | Ile        |
| Ala        | Glu<br>130 | Phe        | Lys        | Asp        | Lys        | Glu<br>135 | Ser        | Gly        | Glu        | Lys        | Ala<br>140 | Ile        | Lys        | Glu        | Leu        |
| Ser<br>145 | Ser        | Leu        | Lys        | Asn        | Thr<br>150 | Lys        | Val        | Leu        | Tyr        | Thr<br>155 | Tyr        | Asp        | Arg        | Ile        | Phe<br>160 |
| Asn        | Gly        | Ser        | Ala        | Ile<br>165 | Glu        | Thr        | Thr        | Pro        | Asp<br>170 | Asn        | Leu        | Asp        | Lys        | Ile<br>175 | Lys        |
| Gln        | Ile        | Glu        | Gly<br>180 | Ile        | Ser        | Ser        | Val        | Glu<br>185 | Arg        | Ala        | Gln        | Lys        | Val<br>190 | Gln        | Pro        |
| Met        | Met        | Asn<br>195 | His        | Ala        | Arg        | Lys        | Glu<br>200 | Ile        | Gly        | Val        | Glu<br>205 | Glu        | Ala        | Ile        | Asp        |
| Tyr        | Leu<br>210 | Lys        | Ser        | Ile        | Asn        | Ala<br>215 | Pro        | Phe        | Gly        | Lys        | Asn<br>220 | Phe        | Asp        | Gly        | Arg        |
| Gly<br>225 | Met        | Val        | Ile        | Ser        | Asn<br>230 | Ile        | Asp        | Thr        | Gly        | Thr<br>235 | Asp        | Tyr        | Arg        | His        | Lys<br>240 |
| Ala        | Met        | Arg        | Ile        | Asp<br>245 | Asp        | Asp        | Ala        | Lys        | Ala<br>250 | Ser        | Met        | Arg        | Phe        | Lys<br>255 | Lys        |
| Glu        | Asp        | Leu        | Lys<br>260 | Gly        | Thr        | Asp        | Lys        | Asn<br>265 | Tyr        | Trp        | Leu        | Ser        | Asp<br>270 | Lys        | Ile        |
| Pro        | His        | Ala<br>275 | Phe        | Asn        | Tyr        | Tyr        | Asn<br>280 | Gly        | Gly        | Lys        | Ile        | Thr<br>285 | Val        | Glu        | Lys        |
| Tyr        | Asp<br>290 | Asp        | Gly        | Arg        | Asp        | Tyr<br>295 | Phe        | Asp        | Pro        | His        | Gly<br>300 | Met        | His        | Ile        | Ala        |
| Gly<br>305 | Ile        | Leu        | Ala        | Gly        | Asn<br>310 | Asp        | Thr        | Glu        | Gln        | Asp<br>315 | Ile        | Lys        | Asn        | Phe        | Asn<br>320 |

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 Ser Gly Phe Thr Gly Thr Gly Leu Val Gly Glu Lys Tyr Trp Gln Ala  
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 Asn Tyr Ala Thr Ser Ala Ser Ser Ser Ser Trp Asp Leu Val Ala Asn  
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 Arg Ile Tyr Thr Lys Asp Leu Lys Asn Ala Phe Lys Lys Ala Met Asp  
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 Thr Leu Asn Val Ile Asn Gly Lys Ser Thr Tyr Gly Tyr Met Ser Gly  
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 690 695 700  
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 Asn Thr Ala Arg Pro Met Met Asp Ala Thr Ser Trp Lys Glu Lys Ser  
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 Gln Tyr Phe Ala Ser Pro Arg Gln Gln Gly Ala Gly Leu Ile Asn Val  
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 770 775 780  
 Ser Lys Gly Leu Val Asn Ser Tyr Gly Ser Ile Ser Leu Lys Glu Ile  
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 Lys Gly Asp Lys Lys Tyr Phe Thr Ile Lys Leu His Asn Thr Ser Asn  
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 Arg Pro Leu Thr Phe Lys Val Ser Ala Ser Ala Ile Thr Thr Asp Ser  
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Leu Thr Asp Arg Leu Lys Leu Asp Glu Thr Tyr Lys Asp Glu Lys Ser  
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Gly Ala Asn Ile Thr Phe Glu His Asp Thr Phe Thr Ile Gly Ala Asn  
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Ser Ser Phe Asp Leu Asn Ala Val Ile Asn Val Gly Glu Ala Lys Asn  
885 890 895

Lys Asn Lys Phe Val Glu Ser Phe Ile His Phe Glu Ser Val Glu Glu  
900 905 910

Met Glu Ala Leu Asn Ser Asn Gly Lys Lys Ile Asn Phe Gln Pro Ser  
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Leu Ser Met Pro Leu Met Gly Phe Ala Gly Asn Trp Asn His Glu Pro  
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Ile Leu Asp Lys Trp Ala Trp Glu Glu Gly Ser Arg Ser Lys Thr Leu  
945 950 955 960

Gly Gly Tyr Asp Asp Asp Gly Lys Pro Lys Ile Pro Gly Thr Leu Asn  
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Lys Gly Ile Gly Gly Glu His Gly Ile Asp Lys Phe Asn Pro Ala Gly  
980 985 990

Val Ile Gln Asn Arg Lys Asp Lys Asn Thr Thr Ser Leu Asp Gln Asn  
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Pro Glu Leu Phe Ala Phe Asn Asn Glu Gly Ile Asn Ala Pro Ser  
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Ser Ser Gly Ser Lys Ile Ala Asn Ile Tyr Pro Leu Asp Ser Asn  
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Pro Leu Val Leu Arg Ser Ala Glu Glu Gly Leu Ile Ser Ile Val  
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Asn Thr Asn Lys Glu Gly Glu Asn Gln Arg Asp Leu Lys Val Ile  
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|      |      |     |     |     |     |      |     |     |     |     |      |     |     |     |
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| Ser  | Arg  | Glu | His | Phe | Ile | Arg  | Gly | Ile | Leu | Asn | Ser  | Lys | Ser | Asn |
|      | 1085 |     |     |     |     | 1090 |     |     |     |     | 1095 |     |     |     |
| Asp  | Ala  | Lys | Gly | Ile | Lys | Ser  | Ser | Lys | Leu | Lys | Val  | Trp | Gly | Asp |
|      | 1100 |     |     |     |     | 1105 |     |     |     |     | 1110 |     |     |     |
| Leu  | Lys  | Trp | Asp | Gly | Leu | Ile  | Tyr | Asn | Pro | Arg | Gly  | Arg | Glu | Glu |
|      | 1115 |     |     |     |     | 1120 |     |     |     |     | 1125 |     |     |     |
| Asn  | Ala  | Pro | Glu | Ser | Lys | Asp  | Asn | Gln | Asp | Pro | Ala  | Thr | Lys | Ile |
|      | 1130 |     |     |     |     | 1135 |     |     |     |     | 1140 |     |     |     |
| Arg  | Gly  | Gln | Phe | Glu | Pro | Ile  | Ala | Glu | Gly | Gln | Tyr  | Phe | Tyr | Lys |
|      | 1145 |     |     |     |     | 1150 |     |     |     |     | 1155 |     |     |     |
| Phe  | Lys  | Tyr | Arg | Leu | Thr | Lys  | Asp | Tyr | Pro | Trp | Gln  | Val | Ser | Tyr |
|      | 1160 |     |     |     |     | 1165 |     |     |     |     | 1170 |     |     |     |
| Ile  | Pro  | Val | Lys | Ile | Asp | Asn  | Thr | Ala | Pro | Lys | Ile  | Val | Ser | Val |
|      | 1175 |     |     |     |     | 1180 |     |     |     |     | 1185 |     |     |     |
| Asp  | Phe  | Ser | Asn | Pro | Glu | Lys  | Ile | Lys | Leu | Ile | Thr  | Lys | Asp | Thr |
|      | 1190 |     |     |     |     | 1195 |     |     |     |     | 1200 |     |     |     |
| Tyr  | His  | Lys | Val | Lys | Asp | Gln  | Tyr | Lys | Asn | Glu | Thr  | Leu | Phe | Ala |
|      | 1205 |     |     |     |     | 1210 |     |     |     |     | 1215 |     |     |     |
| Arg  | Asp  | Gln | Lys | Glu | His | Pro  | Glu | Lys | Phe | Asp | Glu  | Ile | Ala | Asn |
|      | 1220 |     |     |     |     | 1225 |     |     |     |     | 1230 |     |     |     |
| Glu  | Val  | Trp | Tyr | Ala | Gly | Ala  | Ala | Leu | Val | Asn | Glu  | Asp | Gly | Glu |
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| Val  | Glu  | Lys | Asn | Leu | Glu | Val  | Thr | Tyr | Ala | Gly | Glu  | Gly | Gln | Gly |
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| Arg  | Asn  | Arg | Lys | Leu | Asp | Lys  | Asp | Gly | Asn | Thr | Ile  | Tyr | Glu | Ile |
|      | 1265 |     |     |     |     | 1270 |     |     |     |     | 1275 |     |     |     |
| Lys  | Gly  | Ala | Gly | Asp | Leu | Arg  | Gly | Lys | Ile | Ile | Glu  | Val | Ile | Ala |
|      | 1280 |     |     |     |     | 1285 |     |     |     |     | 1290 |     |     |     |
| Leu  | Asp  | Gly | Ser | Ser | Asn | Phe  | Thr | Lys | Ile | His | Arg  | Ile | Lys | Phe |
|      | 1295 |     |     |     |     | 1300 |     |     |     |     | 1305 |     |     |     |

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| Ala | Asn  | Gln | Ala | Asp | Glu | Lys  | Gly | Met | Ile | Ser | Tyr  | Tyr | Leu | Val |
|     | 1310 |     |     |     |     | 1315 |     |     |     |     | 1320 |     |     |     |
| Asp | Pro  | Asp | Gln | Asp | Ser | Ser  | Lys | Tyr | Gln | Lys | Leu  | Gly | Glu | Ile |
|     | 1325 |     |     |     |     | 1330 |     |     |     |     | 1335 |     |     |     |
| Ala | Glu  | Ser | Lys | Phe | Lys | Asn  | Leu | Gly | Asn | Gly | Lys  | Glu | Gly | Ser |
|     | 1340 |     |     |     |     | 1345 |     |     |     |     | 1350 |     |     |     |
| Leu | Lys  | Lys | Asp | Thr | Thr | Gly  | Val | Glu | His | His | His  | Gln | Glu | Asn |
|     | 1355 |     |     |     |     | 1360 |     |     |     |     | 1365 |     |     |     |
| Glu | Glu  | Ser | Ile | Lys | Glu | Lys  | Ser | Ser | Phe | Thr | Ile  | Asp | Arg | Asn |
|     | 1370 |     |     |     |     | 1375 |     |     |     |     | 1380 |     |     |     |
| Ile | Ser  | Thr | Ile | Arg | Asp | Phe  | Glu | Asn | Lys | Asp | Leu  | Lys | Lys | Leu |
|     | 1385 |     |     |     |     | 1390 |     |     |     |     | 1395 |     |     |     |
| Ile | Lys  | Lys | Lys | Phe | Arg | Glu  | Val | Asp | Asp | Phe | Thr  | Ser | Glu | Thr |
|     | 1400 |     |     |     |     | 1405 |     |     |     |     | 1410 |     |     |     |
| Gly | Lys  | Arg | Met | Glu | Glu | Tyr  | Asp | Tyr | Lys | Tyr | Asp  | Asp | Lys | Gly |
|     | 1415 |     |     |     |     | 1420 |     |     |     |     | 1425 |     |     |     |
| Asn | Ile  | Ile | Ala | Tyr | Asp | Asp  | Gly | Thr | Asp | Leu | Glu  | Tyr | Glu | Thr |
|     | 1430 |     |     |     |     | 1435 |     |     |     |     | 1440 |     |     |     |
| Glu | Lys  | Leu | Asp | Glu | Ile | Lys  | Ser | Lys | Ile | Tyr | Gly  | Val | Leu | Ser |
|     | 1445 |     |     |     |     | 1450 |     |     |     |     | 1455 |     |     |     |
| Pro | Ser  | Lys | Asp | Gly | His | Phe  | Glu | Ile | Leu | Gly | Lys  | Ile | Ser | Asn |
|     | 1460 |     |     |     |     | 1465 |     |     |     |     | 1470 |     |     |     |
| Val | Ser  | Lys | Asn | Ala | Lys | Val  | Tyr | Tyr | Gly | Asn | Asn  | Tyr | Lys | Ser |
|     | 1475 |     |     |     |     | 1480 |     |     |     |     | 1485 |     |     |     |
| Ile | Glu  | Ile | Lys | Ala | Thr | Lys  | Tyr | Asp | Phe | His | Ser  | Lys | Thr | Met |
|     | 1490 |     |     |     |     | 1495 |     |     |     |     | 1500 |     |     |     |
| Thr | Phe  | Asp | Leu | Tyr | Ala | Asn  | Ile | Asn | Asp | Ile | Val  | Asp | Gly | Leu |
|     | 1505 |     |     |     |     | 1510 |     |     |     |     | 1515 |     |     |     |
| Ala | Phe  | Ala | Gly | Asp | Met | Arg  | Leu | Phe | Val | Lys | Asp  | Asn | Asp | Gln |
|     | 1520 |     |     |     |     | 1525 |     |     |     |     | 1530 |     |     |     |
| Lys | Lys  | Ala | Glu | Ile | Lys | Ile  | Arg | Met | Pro | Glu | Lys  | Ile | Lys | Glu |
|     | 1535 |     |     |     |     | 1540 |     |     |     |     | 1545 |     |     |     |



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| Glu | Leu<br>1565 | Gly | Glu | Gly | Asp | Leu<br>1570 | Ser | Lys | Asn | Lys | Pro<br>1575 | Asp | Asn | Leu |
| Thr | Lys<br>1580 | Met | Glu | Ser | Gly | Lys<br>1585 | Ile | Tyr | Ser | Asp | Ser<br>1590 | Glu | Lys | Gln |
| Gln | Tyr<br>1595 | Leu | Leu | Lys | Asp | Asn<br>1600 | Ile | Ile | Leu | Arg | Lys<br>1605 | Gly | Tyr | Ala |
| Leu | Lys<br>1610 | Val | Thr | Thr | Tyr | Asn<br>1615 | Pro | Gly | Lys | Thr | Asp<br>1620 | Met | Leu | Glu |
| Gly | Asn<br>1625 | Gly | Val | Tyr | Ser | Lys<br>1630 | Glu | Asp | Ile | Ala | Lys<br>1635 | Ile | Gln | Lys |
| Ala | Asn<br>1640 | Pro | Asn | Leu | Arg | Ala<br>1645 | Leu | Ser | Glu | Thr | Thr<br>1650 | Ile | Tyr | Ala |
| Asp | Ser<br>1655 | Arg | Asn | Val | Glu | Asp<br>1660 | Gly | Arg | Ser | Thr | Gln<br>1665 | Ser | Val | Leu |
| Met | Ser<br>1670 | Ala | Leu | Asp | Gly | Phe<br>1675 | Asn | Ile | Ile | Arg | Tyr<br>1680 | Gln | Val | Phe |
| Thr | Phe<br>1685 | Lys | Met | Asn | Asp | Lys<br>1690 | Gly | Glu | Ala | Ile | Asp<br>1695 | Lys | Asp | Gly |
| Asn | Leu<br>1700 | Val | Thr | Asp | Ser | Ser<br>1705 | Lys | Leu | Val | Leu | Phe<br>1710 | Gly | Lys | Asp |
| Asp | Lys<br>1715 | Glu | Tyr | Thr | Gly | Glu<br>1720 | Asp | Lys | Phe | Asn | Val<br>1725 | Glu | Ala | Ile |
| Lys | Glu<br>1730 | Asp | Gly | Ser | Met | Leu<br>1735 | Phe | Ile | Asp | Thr | Lys<br>1740 | Pro | Val | Asn |
| Leu | Ser<br>1745 | Met | Asp | Lys | Asn | Tyr<br>1750 | Phe | Asn | Pro | Ser | Lys<br>1755 | Ser | Asn | Lys |
| Ile | Tyr<br>1760 | Val | Arg | Asn | Pro | Glu<br>1765 | Phe | Tyr | Leu | Arg | Gly<br>1770 | Lys | Ile | Ser |
| Asp | Lys<br>1775 | Gly | Gly | Phe | Asn | Trp<br>1780 | Glu | Leu | Arg | Val | Asn<br>1785 | Glu | Ser | Val |

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|     |      |     |     |     |     |      |     |     |     |     |      |     |     |     |
|-----|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Val | Asp  | Asn | Tyr | Leu | Ile | Tyr  | Gly | Asp | Leu | His | Ile  | Asp | Asn | Thr |
|     | 1790 |     |     |     |     | 1795 |     |     |     |     | 1800 |     |     |     |
| Arg | Asp  | Phe | Asn | Ile | Lys | Leu  | Asn | Val | Lys | Asp | Gly  | Asp | Ile | Met |
|     | 1805 |     |     |     |     | 1810 |     |     |     |     | 1815 |     |     |     |
| Asp | Trp  | Gly | Met | Lys | Asp | Tyr  | Lys | Ala | Asn | Gly | Phe  | Pro | Asp | Lys |
|     | 1820 |     |     |     |     | 1825 |     |     |     |     | 1830 |     |     |     |
| Val | Thr  | Asp | Met | Asp | Gly | Asn  | Val | Tyr | Leu | Gln | Thr  | Gly | Tyr | Ser |
|     | 1835 |     |     |     |     | 1840 |     |     |     |     | 1845 |     |     |     |
| Asp | Leu  | Asn | Ala | Lys | Ala | Val  | Gly | Val | His | Tyr | Gln  | Phe | Leu | Tyr |
|     | 1850 |     |     |     |     | 1855 |     |     |     |     | 1860 |     |     |     |
| Asp | Asn  | Val | Lys | Pro | Glu | Val  | Asn | Ile | Asp | Pro | Lys  | Gly | Asn | Thr |
|     | 1865 |     |     |     |     | 1870 |     |     |     |     | 1875 |     |     |     |
| Ser | Ile  | Glu | Tyr | Ala | Asp | Gly  | Lys | Ser | Val | Val | Phe  | Asn | Ile | Asn |
|     | 1880 |     |     |     |     | 1885 |     |     |     |     | 1890 |     |     |     |
| Asp | Lys  | Arg | Asn | Asn | Gly | Phe  | Asp | Gly | Glu | Ile | Gln  | Glu | Gln | His |
|     | 1895 |     |     |     |     | 1900 |     |     |     |     | 1905 |     |     |     |
| Ile | Tyr  | Ile | Asn | Gly | Lys | Glu  | Tyr | Thr | Ser | Phe | Asn  | Asp | Ile | Lys |
|     | 1910 |     |     |     |     | 1915 |     |     |     |     | 1920 |     |     |     |
| Gln | Ile  | Ile | Asp | Lys | Thr | Leu  | Asn | Ile | Lys | Ile | Val  | Val | Lys | Asp |
|     | 1925 |     |     |     |     | 1930 |     |     |     |     | 1935 |     |     |     |
| Phe | Ala  | Arg | Asn | Thr | Thr | Val  | Lys | Glu | Phe | Ile | Leu  | Asn | Lys | Asp |
|     | 1940 |     |     |     |     | 1945 |     |     |     |     | 1950 |     |     |     |
| Thr | Gly  | Glu | Val | Ser | Glu | Leu  | Lys | Pro | His | Arg | Val  | Thr | Val | Thr |
|     | 1955 |     |     |     |     | 1960 |     |     |     |     | 1965 |     |     |     |
| Ile | Gln  | Asn | Gly | Lys | Glu | Met  | Ser | Ser | Thr | Ile | Val  | Ser | Glu | Glu |
|     | 1970 |     |     |     |     | 1975 |     |     |     |     | 1980 |     |     |     |
| Asp | Phe  | Ile | Leu | Pro | Val | Tyr  | Lys | Gly | Glu | Leu | Glu  | Lys | Gly | Tyr |
|     | 1985 |     |     |     |     | 1990 |     |     |     |     | 1995 |     |     |     |
| Gln | Phe  | Asp | Gly | Trp | Glu | Ile  | Ser | Gly | Phe | Glu | Gly  | Lys | Lys | Asp |
|     | 2000 |     |     |     |     | 2005 |     |     |     |     | 2010 |     |     |     |
| Ala | Gly  | Tyr | Val | Ile | Asn | Leu  | Ser | Lys | Asp | Thr | Phe  | Ile | Lys | Pro |

2015

2020

Val Phe Lys Lys Ile Glu Glu Lys Lys Glu Glu Glu Asn Lys Pro  
2030 2035 2040

Thr Phe Asp Val Ser Lys Lys Lys Asp Asn Pro Gln Val Asn His  
2045 2050 2055

Ser Gln Leu Asn Glu Ser His Arg Lys Glu Asp Leu Gln Arg Glu  
2060 2065 2070

Glu His Ser Gln Lys Ser Asp Ser Thr Lys Asp Val Thr Ala Thr  
2075 2080 2085

Val Leu Asp Lys Asn Asn Ile Ser Ser Lys Ser Thr Thr Asn Asn  
2090 2095 2100

Pro Asn Lys Leu Pro Lys Thr Gly Thr Ala Ser Gly Ala Gln Thr  
2105 2110 2115

Leu Leu Ala Ala Gly Ile Met Phe Ile Val Gly Ile Phe Leu Gly  
2120 2125 2130

Leu Lys Lys Lys Asn Gln Asp  
2135 2140

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<211> 2233  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 178

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1 5 10 15

Phe Ala Val Gly Ala Cys Ser Val Met Ile Gly Thr Cys Ala Val Leu  
20 25 30

Leu Gly Gly Asn Ile Ala Gly Glu Ser Val Val Tyr Ala Asp Glu Thr  
35 40 45

Leu Ile Thr His Thr Ala Glu Lys Pro Lys Glu Glu Lys Met Ile Val  
50 55 60

Glu Glu Lys Ala Asp Lys Ala Leu Glu Thr Lys Asn Ile Val Glu Arg  
65 70 75 80

Thr Glu Gln Ser Glu Pro Ser Ser Thr Glu Ala Ile Ala Ser Glu Lys

Lys Glu Asp Glu<sub>100</sub> Ala Val Thr Pro Lys<sub>105</sub> Glu Glu Lys Val Ser<sub>110</sub> Ala Lys  
Pro Glu Glu<sub>115</sub> Lys Ala Pro Arg Ile<sub>120</sub> Glu Ser Gln Ala Ser<sub>125</sub> Asn Gln Glu  
Lys Pro<sub>130</sub> Leu Lys Glu Asp Ala<sub>135</sub> Lys Ala Val Thr Asn<sub>140</sub> Glu Glu Val Asn  
Gln Met Ile Glu Asp Arg<sub>150</sub> Lys Val Asp Phe Asn<sub>155</sub> Gln Asn Trp Tyr Phe<sub>160</sub>  
Lys Leu Asn Ala Asn<sub>165</sub> Ser Lys Glu Ala Ile<sub>170</sub> Lys Pro Asp Ala Asp<sub>175</sub> Val  
Ser Thr Trp Lys<sub>180</sub> Lys Leu Asp Leu Pro<sub>185</sub> Tyr Asp Trp Ser Ile<sub>190</sub> Phe Asn  
Asp Phe Asp<sub>195</sub> His Glu Ser Pro Ala<sub>200</sub> Gln Asn Glu Gly Gly<sub>205</sub> Gln Leu Asn  
Gly Gly<sub>210</sub> Glu Ala Trp Tyr Arg<sub>215</sub> Lys Thr Phe Lys Leu<sub>220</sub> Asp Glu Lys Asp  
Leu Lys Lys Asn Val Arg<sub>230</sub> Leu Thr Phe Asp Gly<sub>235</sub> Val Tyr Met Asp Ser<sub>240</sub>  
Gln Val Tyr Val Asn<sub>245</sub> Gly Gln Leu Val Gly<sub>250</sub> His Tyr Pro Asn Gly<sub>255</sub> Tyr  
Asn Gln Phe Ser<sub>260</sub> Tyr Asp Ile Thr Lys<sub>265</sub> Tyr Leu Gln Lys Asp<sub>270</sub> Gly Arg  
Glu Asn Val<sub>275</sub> Ile Ala Val His Ala<sub>280</sub> Val Asn Lys Gln Pro<sub>285</sub> Ser Ser Arg  
Trp Tyr<sub>290</sub> Ser Gly Ser Gly Ile<sub>295</sub> Tyr Arg Asp Val Thr<sub>300</sub> Leu Gln Val Thr  
Asp Lys Val His Val Glu<sub>310</sub> Lys Asn Gly Thr Thr<sub>315</sub> Ile Leu Thr Pro Lys<sub>320</sub>  
Leu Glu Glu Gln Gln<sub>325</sub> His Gly Lys Val Glu<sub>330</sub> Thr His Val Thr Ser<sub>335</sub> Lys

Ile Val Asn Thr Asp Asp Lys Asp His Glu Leu Val Ala Glu Tyr Gln  
 340 345 350  
 Ile Val Glu Arg Gly Gly His Ala Val Thr Gly Leu Val Arg Thr Ala  
 355 360 365  
 Ser Arg Thr Leu Lys Ala His Glu Ser Thr Ser Leu Asp Ala Ile Leu  
 370 375 380  
 Glu Val Glu Arg Pro Lys Leu Trp Thr Val Leu Asn Asp Lys Pro Ala  
 385 390 395 400  
 Leu Tyr Glu Leu Ile Thr Arg Val Tyr Arg Asp Gly Gln Leu Val Asp  
 405 410 415  
 Ala Lys Lys Asp Leu Phe Gly Tyr Arg Tyr Tyr His Trp Thr Pro Asn  
 420 425 430  
 Glu Gly Phe Ser Leu Asn Gly Glu Arg Ile Lys Phe His Gly Val Ser  
 435 440 445  
 Leu His His Asp His Gly Ala Leu Gly Ala Glu Glu Asn Tyr Lys Ala  
 450 455 460  
 Glu Tyr Arg Arg Leu Lys Gln Met Lys Glu Met Gly Val Asn Ser Ile  
 465 470 475 480  
 Arg Thr Thr His Asn Pro Ala Ser Glu Gln Thr Leu Gln Ile Ala Ala  
 485 490 495  
 Glu Leu Gly Leu Leu Val Gln Glu Glu Ala Phe Asp Thr Trp Tyr Gly  
 500 505 510  
 Gly Lys Lys Pro Tyr Asp Tyr Gly Arg Phe Phe Glu Lys Asp Ala Thr  
 515 520 525  
 His Pro Glu Ala Arg Lys Gly Glu Lys Trp Ser Asp Phe Asp Leu Arg  
 530 535 540  
 Thr Met Val Glu Arg Gly Lys Asn Asn Pro Ala Ile Phe Met Trp Ser  
 545 550 555 560  
 Ile Gly Asn Glu Ile Gly Glu Ala Asn Gly Asp Ala His Ser Leu Ala  
 565 570 575  
 Thr Val Lys Arg Leu Val Lys Val Ile Lys Asp Val Asp Lys Thr Arg  
 580 585 590

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Tyr Val Thr Met Gly Ala Asp Lys Phe Arg Phe Gly Asn Gly Ser Gly  
 595 600 605  
 Gly His Glu Lys Ile Ala Asp Glu Leu Asp Ala Val Gly Phe Asn Tyr  
 610 615 620  
 Ser Glu Asp Asn Tyr Lys Ala Leu Arg Ala Lys His Pro Lys Trp Leu  
 625 630 635 640  
 Ile Tyr Gly Ser Glu Thr Ser Ser Ala Thr Arg Thr Arg Gly Ser Tyr  
 645 650 655  
 Tyr Arg Pro Glu Arg Glu Leu Lys His Ser Asn Gly Pro Glu Arg Asn  
 660 665 670  
 Tyr Glu Gln Ser Asp Tyr Gly Asn Asp Arg Val Gly Trp Gly Lys Thr  
 675 680 685  
 Ala Thr Ala Ser Trp Thr Phe Asp Arg Asp Asn Ala Gly Tyr Ala Gly  
 690 695 700  
 Gln Phe Ile Trp Thr Gly Thr Asp Tyr Ile Gly Glu Pro Thr Pro Trp  
 705 710 715 720  
 His Asn Gln Asn Gln Thr Pro Val Lys Ser Ser Tyr Phe Gly Ile Val  
 725 730 735  
 Asp Thr Ala Gly Ile Pro Lys His Asp Phe Tyr Leu Tyr Gln Ser Gln  
 740 745 750  
 Trp Val Ser Val Lys Lys Lys Pro Met Val His Leu Leu Pro His Trp  
 755 760 765  
 Asn Trp Glu Asn Lys Glu Leu Ala Ser Lys Val Ala Asp Ser Glu Gly  
 770 775 780  
 Lys Ile Pro Val Arg Ala Tyr Ser Asn Ala Ser Ser Val Glu Leu Phe  
 785 790 795 800  
 Leu Asn Gly Lys Ser Leu Gly Leu Lys Thr Phe Asn Lys Lys Gln Thr  
 805 810 815  
 Ser Asp Gly Arg Thr Tyr Gln Glu Gly Ala Asn Ala Asn Glu Leu Tyr  
 820 825 830  
 Leu Glu Trp Lys Val Ala Tyr Gln Pro Gly Thr Leu Glu Ala Ile Ala  
 835 840 845

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Arg Asp Glu Ser Gly Lys Glu Ile Ala Arg Asp Lys Ile Thr Thr Ala  
850 855 860

Gly Lys Pro Ala Ala Val Arg Leu Ile Lys Glu Asp His Ala Ile Ala  
865 870 875 880

Ala Asp Gly Lys Asp Leu Thr Tyr Ile Tyr Tyr Glu Ile Val Asp Ser  
885 890 895

Gln Gly Asn Val Val Pro Thr Ala Asn Asn Leu Val Arg Phe Gln Leu  
900 905 910

His Gly Gln Gly Gln Leu Val Gly Val Asp Asn Gly Glu Gln Ala Ser  
915 920 925

Arg Glu Arg Tyr Lys Ala Gln Ala Asp Gly Ser Trp Ile Arg Lys Ala  
930 935 940

Phe Asn Gly Lys Gly Val Ala Ile Val Lys Ser Thr Glu Gln Ala Gly  
945 950 955 960

Lys Phe Thr Leu Thr Ala His Ser Asp Leu Leu Lys Ser Asn Gln Val  
965 970 975

Thr Val Phe Thr Gly Lys Lys Glu Gly Gln Glu Lys Thr Val Leu Gly  
980 985 990

Thr Glu Val Pro Lys Val Gln Thr Ile Ile Gly Glu Ala Pro Glu Met  
995 1000 1005

Pro Thr Thr Val Pro Phe Val Tyr Ser Asp Gly Ser Arg Ala Glu  
1010 1015 1020

Arg Pro Val Thr Trp Ser Ser Val Asp Val Ser Lys Pro Gly Ile  
1025 1030 1035

Val Thr Val Lys Gly Met Ala Asp Gly Arg Glu Val Glu Ala Arg  
1040 1045 1050

Val Glu Val Ile Ala Leu Lys Ser Glu Leu Pro Val Val Lys Arg  
1055 1060 1065

Ile Ala Pro Asn Thr Asp Leu Asn Ser Val Asp Lys Ser Val Ser  
1070 1075 1080

Tyr Val Leu Ile Asp Gly Ser Val Glu Glu Tyr Glu Val Asp Lys

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1095

|     |             |     |     |     |     |             |     |     |     |     |             |      |     |     |  |
|-----|-------------|-----|-----|-----|-----|-------------|-----|-----|-----|-----|-------------|------|-----|-----|--|
|     | 1085        |     |     |     |     | 1090        |     |     |     |     |             | 1095 |     |     |  |
| Trp | Glu<br>1100 | Ile | Ala | Glu | Glu | Asp<br>1105 | Lys | Ala | Lys | Leu | Ala<br>1110 | Ile  | Pro | Gly |  |
| Ser | Arg<br>1115 | Ile | Gln | Ala | Thr | Gly<br>1120 | Tyr | Leu | Glu | Gly | Gln<br>1125 | Pro  | Ile | His |  |
| Ala | Thr<br>1130 | Leu | Val | Val | Glu | Glu<br>1135 | Gly | Asn | Pro | Ala | Ala<br>1140 | Pro  | Ala | Val |  |
| Pro | Thr<br>1145 | Val | Thr | Val | Gly | Gly<br>1150 | Glu | Ala | Val | Thr | Gly<br>1155 | Leu  | Thr | Ser |  |
| Gln | Lys<br>1160 | Pro | Met | Gln | Tyr | Arg<br>1165 | Thr | Leu | Ala | Tyr | Gly<br>1170 | Ala  | Lys | Leu |  |
| Pro | Glu<br>1175 | Val | Thr | Ala | Ser | Ala<br>1180 | Lys | Asn | Ala | Ala | Val<br>1185 | Thr  | Val | Leu |  |
| Gln | Ala<br>1190 | Ser | Ala | Ala | Asn | Gly<br>1195 | Met | Arg | Ala | Ser | Ile<br>1200 | Phe  | Ile | Gln |  |
| Pro | Lys<br>1205 | Asp | Gly | Gly | Pro | Leu<br>1210 | Gln | Thr | Tyr | Ala | Ile<br>1215 | Gln  | Phe | Leu |  |
| Glu | Glu<br>1220 | Ala | Pro | Lys | Ile | Ala<br>1225 | His | Leu | Ser | Leu | Gln<br>1230 | Val  | Glu | Lys |  |
| Ala | Asp<br>1235 | Ser | Leu | Lys | Glu | Asp<br>1240 | Gln | Thr | Val | Lys | Leu<br>1245 | Ser  | Val | Arg |  |
| Ala | His<br>1250 | Tyr | Gln | Asp | Gly | Thr<br>1255 | Gln | Ala | Val | Leu | Pro<br>1260 | Ala  | Asp | Lys |  |
| Val | Thr<br>1265 | Phe | Ser | Thr | Ser | Gly<br>1270 | Glu | Gly | Glu | Val | Ala<br>1275 | Ile  | Arg | Lys |  |
| Gly | Met<br>1280 | Leu | Glu | Leu | His | Lys<br>1285 | Pro | Gly | Ala | Val | Thr<br>1290 | Leu  | Asn | Ala |  |
| Glu | Tyr<br>1295 | Glu | Gly | Ala | Lys | Asp<br>1300 | Gln | Val | Glu | Leu | Thr<br>1305 | Ile  | Gln | Ala |  |
| Asn | Thr<br>1310 | Glu | Lys | Lys | Ile | Ala<br>1315 | Gln | Ser | Ile | Arg | Pro<br>1320 | Val  | Asn | Val |  |



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|     |      |     |     |     |     |      |     |     |     |     |      |     |     |     |
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| Val | Thr  | Asp | Leu | His | Gln | Glu  | Pro | Ser | Leu | Pro | Ala  | Thr | Val | Thr |
|     | 1325 |     |     |     |     | 1330 |     |     |     |     | 1335 |     |     |     |
| Val | Glu  | Tyr | Asp | Lys | Gly | Phe  | Pro | Lys | Thr | His | Lys  | Val | Thr | Trp |
|     | 1340 |     |     |     |     | 1345 |     |     |     |     | 1350 |     |     |     |
| Gln | Ala  | Ile | Pro | Lys | Glu | Lys  | Leu | Asp | Ser | Tyr | Gln  | Thr | Phe | Glu |
|     | 1355 |     |     |     |     | 1360 |     |     |     |     | 1365 |     |     |     |
| Val | Leu  | Gly | Lys | Val | Glu | Gly  | Ile | Asp | Leu | Glu | Ala  | Arg | Ala | Lys |
|     | 1370 |     |     |     |     | 1375 |     |     |     |     | 1380 |     |     |     |
| Val | Ser  | Val | Glu | Gly | Ile | Val  | Ser | Val | Glu | Glu | Val  | Ser | Val | Thr |
|     | 1385 |     |     |     |     | 1390 |     |     |     |     | 1395 |     |     |     |
| Thr | Pro  | Ile | Ala | Glu | Ala | Pro  | Gln | Leu | Pro | Glu | Ser  | Val | Arg | Thr |
|     | 1400 |     |     |     |     | 1405 |     |     |     |     | 1410 |     |     |     |
| Tyr | Asp  | Ser | Asn | Gly | His | Val  | Ser | Ser | Ala | Lys | Val  | Ala | Trp | Asp |
|     | 1415 |     |     |     |     | 1420 |     |     |     |     | 1425 |     |     |     |
| Ala | Ile  | Arg | Pro | Glu | Gln | Tyr  | Ala | Lys | Glu | Gly | Val  | Phe | Thr | Val |
|     | 1430 |     |     |     |     | 1435 |     |     |     |     | 1440 |     |     |     |
| Asn | Gly  | Arg | Leu | Glu | Gly | Thr  | Gln | Leu | Thr | Thr | Lys  | Leu | His | Val |
|     | 1445 |     |     |     |     | 1450 |     |     |     |     | 1455 |     |     |     |
| Arg | Val  | Ser | Ala | Gln | Thr | Glu  | Gln | Gly | Ala | Asn | Ile  | Ser | Asp | Gln |
|     | 1460 |     |     |     |     | 1465 |     |     |     |     | 1470 |     |     |     |
| Trp | Thr  | Gly | Ser | Glu | Leu | Pro  | Leu | Ala | Phe | Ala | Ser  | Asp | Ser | Asn |
|     | 1475 |     |     |     |     | 1480 |     |     |     |     | 1485 |     |     |     |
| Pro | Ser  | Asp | Pro | Val | Ser | Asn  | Val | Asn | Asp | Lys | Leu  | Ile | Ser | Tyr |
|     | 1490 |     |     |     |     | 1495 |     |     |     |     | 1500 |     |     |     |
| Asn | Asn  | Gln | Pro | Ala | Asn | Arg  | Trp | Thr | Asn | Trp | Asn  | Arg | Thr | Asn |
|     | 1505 |     |     |     |     | 1510 |     |     |     |     | 1515 |     |     |     |
| Pro | Glu  | Ala | Ser | Val | Gly | Val  | Leu | Phe | Gly | Asp | Ser  | Gly | Ile | Leu |
|     | 1520 |     |     |     |     | 1525 |     |     |     |     | 1530 |     |     |     |
| Ser | Lys  | Arg | Ser | Val | Asp | Asn  | Leu | Ser | Val | Gly | Phe  | His | Glu | Asp |
|     | 1535 |     |     |     |     | 1540 |     |     |     |     | 1545 |     |     |     |
| His | Gly  | Val | Gly | Val | Pro | Lys  | Ser | Tyr | Val | Ile | Glu  | Tyr | Tyr | Val |
|     | 1550 |     |     |     |     | 1555 |     |     |     |     | 1560 |     |     |     |

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|     |             |     |     |     |     |             |     |     |     |     |             |     |     |     |
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| Gly | Lys<br>1565 | Thr | Val | Pro | Thr | Ala<br>1570 | Pro | Lys | Asn | Pro | Ser<br>1575 | Phe | Val | Gly |
| Asn | Glu<br>1580 | Asp | His | Val | Phe | Asn<br>1585 | Asp | Ser | Ala | Asn | Trp<br>1590 | Lys | Pro | Val |
| Thr | Asn<br>1595 | Leu | Lys | Ala | Pro | Ala<br>1600 | Gln | Leu | Lys | Ala | Gly<br>1605 | Glu | Met | Asn |
| His | Phe<br>1610 | Ser | Phe | Asp | Lys | Val<br>1615 | Glu | Thr | Tyr | Ala | Val<br>1620 | Arg | Ile | Arg |
| Met | Val<br>1625 | Lys | Ala | Asp | Asn | Lys<br>1630 | Arg | Gly | Thr | Ser | Ile<br>1635 | Thr | Glu | Val |
| Gln | Ile<br>1640 | Phe | Ala | Lys | Gln | Val<br>1645 | Ala | Ala | Ala | Lys | Gln<br>1650 | Gly | Gln | Thr |
| Arg | Ile<br>1655 | Gln | Val | Asp | Gly | Lys<br>1660 | Asp | Leu | Ala | Asn | Phe<br>1665 | Asn | Pro | Asp |
| Leu | Thr<br>1670 | Asp | Tyr | Tyr | Leu | Glu<br>1675 | Ser | Val | Asp | Gly | Lys<br>1680 | Val | Pro | Ala |
| Val | Thr<br>1685 | Ala | Ser | Val | Ser | Asn<br>1690 | Asn | Gly | Leu | Ala | Thr<br>1695 | Val | Val | Pro |
| Ser | Val<br>1700 | Arg | Glu | Gly | Glu | Pro<br>1705 | Val | Arg | Val | Ile | Ala<br>1710 | Lys | Ala | Glu |
| Asn | Gly<br>1715 | Asp | Ile | Leu | Gly | Glu<br>1720 | Tyr | Arg | Leu | His | Phe<br>1725 | Thr | Lys | Asp |
| Lys | Ser<br>1730 | Leu | Leu | Ser | His | Lys<br>1735 | Pro | Val | Ala | Ala | Val<br>1740 | Lys | Gln | Ala |
| Arg | Leu<br>1745 | Leu | Gln | Val | Gly | Gln<br>1750 | Ala | Leu | Glu | Leu | Pro<br>1755 | Thr | Lys | Val |
| Pro | Val<br>1760 | Tyr | Phe | Thr | Gly | Lys<br>1765 | Asp | Gly | Tyr | Glu | Thr<br>1770 | Lys | Asp | Leu |
| Thr | Val<br>1775 | Glu | Trp | Glu | Glu | Val<br>1780 | Pro | Ala | Glu | Asn | Leu<br>1785 | Thr | Lys | Ala |
| Gly | Gln<br>1790 | Phe | Thr | Val | Arg | Gly<br>1795 | Arg | Val | Leu | Gly | Ser<br>1800 | Asn | Leu | Val |

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|     |      |     |     |     |     |      |     |     |     |     |      |     |     |     |
|-----|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Ala | Glu  | Ile | Thr | Val | Arg | Val  | Thr | Asp | Lys | Leu | Gly  | Glu | Thr | Leu |
|     | 1805 |     |     |     |     | 1810 |     |     |     |     | 1815 |     |     |     |
| Ser | Asp  | Asn | Pro | Asn | Tyr | Asp  | Glu | Asn | Ser | Asn | Gln  | Ala | Phe | Ala |
|     | 1820 |     |     |     |     | 1825 |     |     |     |     | 1830 |     |     |     |
| Ser | Ala  | Thr | Asn | Asp | Ile | Asp  | Lys | Asn | Ser | His | Asp  | Arg | Val | Asp |
|     | 1835 |     |     |     |     | 1840 |     |     |     |     | 1845 |     |     |     |
| Tyr | Leu  | Asn | Asp | Gly | Asp | His  | Ser | Glu | Asn | Arg | Arg  | Trp | Thr | Asn |
|     | 1850 |     |     |     |     | 1855 |     |     |     |     | 1860 |     |     |     |
| Trp | Ser  | Pro | Thr | Pro | Ser | Ser  | Asn | Pro | Glu | Val | Ser  | Ala | Gly | Val |
|     | 1865 |     |     |     |     | 1870 |     |     |     |     | 1875 |     |     |     |
| Ile | Phe  | Arg | Glu | Asn | Gly | Lys  | Ile | Val | Glu | Arg | Thr  | Val | Thr | Gln |
|     | 1880 |     |     |     |     | 1885 |     |     |     |     | 1890 |     |     |     |
| Gly | Lys  | Val | Gln | Phe | Phe | Ala  | Asp | Ser | Gly | Thr | Asp  | Ala | Pro | Ser |
|     | 1895 |     |     |     |     | 1900 |     |     |     |     | 1905 |     |     |     |
| Lys | Leu  | Val | Leu | Glu | Arg | Tyr  | Val | Gly | Pro | Glu | Phe  | Glu | Val | Pro |
|     | 1910 |     |     |     |     | 1915 |     |     |     |     | 1920 |     |     |     |
| Thr | Tyr  | Tyr | Ser | Asn | Tyr | Gln  | Ala | Tyr | Asp | Ala | Asp  | His | Pro | Phe |
|     | 1925 |     |     |     |     | 1930 |     |     |     |     | 1935 |     |     |     |
| Asn | Asn  | Pro | Glu | Asn | Trp | Glu  | Ala | Val | Pro | Tyr | Arg  | Ala | Asp | Lys |
|     | 1940 |     |     |     |     | 1945 |     |     |     |     | 1950 |     |     |     |
| Asp | Ile  | Ala | Ala | Gly | Asp | Glu  | Ile | Asn | Val | Thr | Phe  | Lys | Ala | Ile |
|     | 1955 |     |     |     |     | 1960 |     |     |     |     | 1965 |     |     |     |
| Lys | Ala  | Lys | Ala | Met | Arg | Trp  | Arg | Met | Glu | Arg | Lys  | Ala | Asp | Lys |
|     | 1970 |     |     |     |     | 1975 |     |     |     |     | 1980 |     |     |     |
| Ser | Gly  | Val | Ala | Met | Ile | Glu  | Met | Thr | Phe | Leu | Ala  | Pro | Ser | Glu |
|     | 1985 |     |     |     |     | 1990 |     |     |     |     | 1995 |     |     |     |
| Leu | Pro  | Gln | Glu | Ser | Thr | Gln  | Ser | Lys | Ile | Leu | Val  | Asp | Gly | Lys |
|     | 2000 |     |     |     |     | 2005 |     |     |     |     | 2010 |     |     |     |
| Glu | Leu  | Ala | Asp | Phe | Ala | Glu  | Asn | Arg | Gln | Asp | Tyr  | Gln | Ile | Thr |
|     | 2015 |     |     |     |     | 2020 |     |     |     |     | 2025 |     |     |     |
| Tyr | Lys  | Gly | Gln | Arg | Pro | Lys  | Val | Ser | Val | Glu | Glu  | Asn | Asn | Gln |

2030                      2035                      2040

Val Ala Ser Thr Val Val Asp Ser Gly Glu Asp Ser Phe Pro Val  
2045                      2050                      2055

Leu Val Arg Leu Val Ser Glu Ser Gly Lys Gln Val Lys Glu Tyr  
2060                      2065                      2070

Arg Ile His Leu Thr Lys Glu Lys Pro Val Ser Glu Lys Thr Val  
2075                      2080                      2085

Ala Ala Val Gln Glu Asp Leu Pro Lys Ile Glu Phe Val Glu Lys  
2090                      2095                      2100

Asp Leu Ala Tyr Lys Thr Val Glu Lys Lys Asp Ser Thr Leu Tyr  
2105                      2110                      2115

Leu Gly Glu Thr Arg Val Glu Gln Glu Gly Lys Val Gly Lys Glu  
2120                      2125                      2130

Arg Ile Phe Thr Ala Ile Asn Pro Asp Gly Ser Lys Glu Glu Lys  
2135                      2140                      2145

Leu Arg Glu Val Val Glu Val Pro Thr Asp Arg Ile Val Leu Val  
2150                      2155                      2160

Gly Thr Lys Pro Val Ala Gln Glu Ala Lys Lys Pro Gln Val Ser  
2165                      2170                      2175

Glu Lys Ala Asp Thr Lys Pro Ile Asp Ser Ser Glu Ala Ser Gln  
2180                      2185                      2190

Thr Asn Lys Ala Gln Leu Pro Ser Thr Gly Ser Ala Ala Ser Gln  
2195                      2200                      2205

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Leu Val Val Thr Lys Gly Lys Lys Glu Asp  
2225                      2230

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Page 208

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 Thr Val Gly Ser Leu<sub>70</sub> Leu Leu Ile Tyr Lys Arg<sub>75</sub> Lys Lys Ile Ala Ser<sub>80</sub>  
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 Ala Val Asp Pro<sub>100</sub> Val Ala Thr Leu Ala<sub>105</sub> Leu Ala Ser Arg Glu<sub>110</sub> Gly Val  
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 Leu Lys<sub>130</sub> Thr Leu Gly Leu Asp<sub>135</sub> Thr Val Leu Glu Glu<sub>140</sub> Thr Ser Ala Lys  
 Pro Gly Glu Val Thr Val<sub>150</sub> Val Glu Val Glu Thr<sub>155</sub> Pro Gln Ser Ile Thr<sub>160</sub>  
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 Ala Pro Lys Glu<sub>180</sub> Glu Ala Pro Lys Thr<sub>185</sub> Glu Glu Ser Pro Lys<sub>190</sub> Glu Glu  
 Pro Lys Ser<sub>195</sub> Glu Val Lys Pro Thr<sub>200</sub> Asp Asp Thr Leu Pro<sub>205</sub> Lys Val Glu  
 Glu Gly<sub>210</sub> Lys Glu Asp Ser Ala<sub>215</sub> Glu Pro Ala Pro Val<sub>220</sub> Glu Glu Val Gly  
 Gly<sub>225</sub> Glu Val Glu Ser Lys<sub>230</sub> Pro Glu Glu Lys Val<sub>235</sub> Ala Val Lys Pro Glu<sub>240</sub>  
 Ser Gln Pro Ser Asp<sub>245</sub> Lys Pro Ala Glu Glu<sub>250</sub> Ser Lys Val Glu Gln Ala<sub>255</sub>

Gly Glu Pro Val Ala Pro Arg Glu Asp Glu Lys Ala Pro Val Glu Pro  
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 Glu Lys Gln Pro Glu Ala Pro Glu Glu Glu Lys Ala Val Glu Glu Thr  
 275 280 285  
 Pro Lys Gln Glu Glu Ser Thr Pro Asp Thr Lys Ala Glu Glu Thr Val  
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 Glu Pro Lys Glu Glu Thr Val Asn Gln Ser Ile Glu Gln Pro Lys Val  
 305 310 315 320  
 Glu Thr Pro Ala Val Glu Lys Gln Thr Glu Pro Thr Glu Glu Pro Lys  
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 Val Glu Gln Ala Gly Glu Pro Val Ala Pro Arg Glu Asp Glu Gln Ala  
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 Pro Thr Ala Pro Val Glu Pro Glu Lys Gln Pro Glu Val Pro Glu Glu  
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 Glu Lys Ala Val Glu Glu Thr Pro Lys Pro Glu Asp Lys Ile Lys Gly  
 370 375 380  
 Ile Gly Thr Lys Glu Pro Val Asp Lys Ser Glu Leu Asn Asn Gln Ile  
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 Asp Lys Ala Ser Ser Val Ser Pro Thr Asp Tyr Ser Thr Ala Ser Tyr  
 405 410 415  
 Asn Ala Leu Gly Pro Val Leu Glu Thr Ala Lys Gly Val Tyr Ala Ser  
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 Glu Pro Val Lys Gln Pro Glu Val Asn Ser Glu Thr Asn Lys Leu Lys  
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 Ile Ala Asp Ala Lys Thr Lys Val Lys Glu His Tyr Ser Asp Arg Ser  
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 Ala Glu Leu Lys Lys Gly Glu Glu Val Ile Asn Thr Val Val Leu Thr  
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 Asp Asp Lys Val Thr Thr Glu Thr Ile Ser Ala Ala Phe Lys Asn Leu  
 580 585 590  
 Glu Tyr Tyr Lys Glu Tyr Thr Leu Ser Thr Thr Met Ile Tyr Asp Arg  
 595 600 605  
 Gly Asn Gly Glu Glu Thr Glu Thr Leu Glu Asn Gln Asn Ile Gln Leu  
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 Asp Leu Lys Lys Val Glu Leu Lys Asn Ile Lys Arg Thr Asp Leu Ile  
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 Lys Tyr Glu Asn Gly Lys Glu Thr Asn Glu Ser Leu Ile Thr Thr Ile  
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 Pro Asp Asp Lys Ser Asn Tyr Tyr Leu Lys Ile Thr Ser Asn Asn Gln  
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 Lys Thr Thr Leu Leu Ala Val Lys Asn Ile Glu Glu Thr Thr Val Asn  
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 Gly Thr Pro Val Tyr Lys Val Thr Ala Ile Ala Asp Asn Leu Val Ser  
 690 695 700  
 Arg Thr Ala Asp Asn Lys Phe Glu Glu Glu Tyr Val His Tyr Ile Glu  
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 Lys Pro Lys Val His Glu Asp Asn Val Tyr Tyr Asn Phe Lys Glu Leu  
 725 730 735  
 Val Glu Ala Ile Gln Asn Asp Pro Ser Lys Glu Tyr Arg Leu Gly Gln  
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 Ser Met Ser Ala Arg Asn Val Val Pro Asn Gly Lys Ser Tyr Ile Thr  
 755 760 765

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Lys Glu Phe Thr Gly Lys Leu Leu Ser Ser Glu Gly Lys Gln Phe Ala  
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 Ile Thr Glu Leu Glu His Pro Leu Phe Asn Val Ile Thr Asn Ala Thr  
 785 790 795 800  
 Ile Asn Asn Val Asn Phe Glu Asn Val Glu Ile Glu Arg Ser Gly Gln  
 805 810 815  
 Asp Asn Ile Ala Ser Leu Ala Asn Thr Met Lys Gly Ser Ser Val Ile  
 820 825 830  
 Thr Asn Val Lys Ile Thr Gly Thr Leu Ser Gly Arg Asn Asn Val Ala  
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 Gly Phe Val Asn Asn Met Asn Asp Gly Thr Arg Ile Glu Asn Val Ala  
 850 855 860  
 Phe Phe Gly Lys Leu His Ser Thr Ser Gly Asn Gly Ser His Thr Gly  
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 Gly Ile Ala Gly Thr Asn Tyr Arg Gly Ile Val Arg Lys Ala Tyr Val  
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 Asp Ala Thr Ile Thr Gly Asn Lys Thr Arg Ala Ser Leu Leu Val Pro  
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 Val Glu Val Gly Ala Ile Ala Ser Lys Thr Trp Pro Val Gly Thr Val  
 945 950 955 960  
 Ser Asn Ser Val Ser Tyr Ala Lys Ile Ile Arg Gly Glu Glu Leu Phe  
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 Gly Ser Asn Asp Val Asp Asp Ser Asp Tyr Ala Ser Ala His Ile Lys  
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 Asp Leu Tyr Ala Val Glu Gly Tyr Ser Ser Gly Asn Arg Ser Phe Arg  
 995 1000 1005  
 Lys Ser Lys Thr Phe Thr Lys Leu Thr Lys Glu Gln Ala Asp Ala



|      |     |     |     |     |     |      |     |     |     |     |      |     |     |     |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| 1010 |     |     |     |     |     | 1015 |     |     |     |     |      |     |     |     |
| Lys  | Val | Thr | Thr | Phe | Asn | Ile  | Thr | Ala | Asp | Lys | Leu  | Glu | Ser | Asp |
| 1025 |     |     |     |     |     | 1030 |     |     |     |     | 1035 |     |     |     |
| Leu  | Ser | Pro | Leu | Ala | Lys | Leu  | Asn | Glu | Glu | Lys | Ala  | Tyr | Ser | Ser |
| 1040 |     |     |     |     |     | 1045 |     |     |     |     | 1050 |     |     |     |
| Ile  | Gln | Asp | Tyr | Asn | Ala | Glu  | Tyr | Asn | Gln | Ala | Tyr  | Lys | Asn | Leu |
| 1055 |     |     |     |     |     | 1060 |     |     |     |     | 1065 |     |     |     |
| Glu  | Lys | Leu | Ile | Pro | Phe | Tyr  | Asn | Lys | Asp | Tyr | Ile  | Val | Tyr | Gln |
| 1070 |     |     |     |     |     | 1075 |     |     |     |     | 1080 |     |     |     |
| Gly  | Asn | Lys | Leu | Asn | Lys | Glu  | His | His | Leu | Asn | Thr  | Lys | Glu | Val |
| 1085 |     |     |     |     |     | 1090 |     |     |     |     | 1095 |     |     |     |
| Leu  | Ser | Val | Thr | Ala | Met | Asn  | Asn | Asn | Glu | Phe | Ile  | Thr | Asn | Leu |
| 1100 |     |     |     |     |     | 1105 |     |     |     |     | 1110 |     |     |     |
| Asp  | Glu | Ala | Asn | Lys | Ile | Ile  | Val | His | Tyr | Ala | Asp  | Gly | Thr | Lys |
| 1115 |     |     |     |     |     | 1120 |     |     |     |     | 1125 |     |     |     |
| Asp  | Tyr | Phe | Asn | Leu | Ser | Ser  | Ser | Ser | Glu | Gly | Leu  | Ser | Asn | Val |
| 1130 |     |     |     |     |     | 1135 |     |     |     |     | 1140 |     |     |     |
| Lys  | Glu | Tyr | Thr | Ile | Thr | Asp  | Leu | Gly | Ile | Lys | Tyr  | Thr | Pro | Asn |
| 1145 |     |     |     |     |     | 1150 |     |     |     |     | 1155 |     |     |     |
| Ile  | Val | Gln | Lys | Asp | Asn | Thr  | Thr | Leu | Val | Asn | Asp  | Ile | Lys | Ser |
| 1160 |     |     |     |     |     | 1165 |     |     |     |     | 1170 |     |     |     |
| Ile  | Leu | Glu | Ser | Val | Glu | Leu  | Gln | Ser | Gln | Thr | Met  | Tyr | Gln | His |
| 1175 |     |     |     |     |     | 1180 |     |     |     |     | 1185 |     |     |     |
| Leu  | Asn | Arg | Leu | Gly | Asp | Tyr  | Arg | Val | Asn | Ala | Ile  | Lys | Asp | Leu |
| 1190 |     |     |     |     |     | 1195 |     |     |     |     | 1200 |     |     |     |
| Tyr  | Leu | Glu | Glu | Ser | Phe | Thr  | Asp | Val | Lys | Glu | Asn  | Leu | Thr | Asn |
| 1205 |     |     |     |     |     | 1210 |     |     |     |     | 1215 |     |     |     |
| Leu  | Ile | Thr | Lys | Leu | Val | Gln  | Asn | Glu | Glu | His | Gln  | Leu | Asn | Asp |
| 1220 |     |     |     |     |     | 1225 |     |     |     |     | 1230 |     |     |     |
| Ser  | Pro | Ala | Ala | Arg | Gln | Met  | Ile | Arg | Asp | Lys | Val  | Glu | Lys | Asn |
| 1235 |     |     |     |     |     | 1240 |     |     |     |     | 1245 |     |     |     |

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|     |      |     |     |     |     |      |     |     |     |     |      |     |     |     |
|-----|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Lys | Ala  | Ala | Leu | Leu | Leu | Gly  | Leu | Thr | Tyr | Leu | Asn  | Arg | Tyr | Tyr |
|     | 1250 |     |     |     |     | 1255 |     |     |     |     | 1260 |     |     |     |
| Gly | Val  | Lys | Phe | Gly | Asp | Val  | Asn | Ile | Lys | Glu | Leu  | Met | Leu | Phe |
|     | 1265 |     |     |     |     | 1270 |     |     |     |     | 1275 |     |     |     |
| Lys | Pro  | Asp | Phe | Tyr | Gly | Glu  | Lys | Val | Ser | Val | Leu  | Asp | Arg | Leu |
|     | 1280 |     |     |     |     | 1285 |     |     |     |     | 1290 |     |     |     |
| Ile | Glu  | Ile | Gly | Ser | Lys | Glu  | Asn | Asn | Ile | Lys | Gly  | Ser | Arg | Thr |
|     | 1295 |     |     |     |     | 1300 |     |     |     |     | 1305 |     |     |     |
| Phe | Asp  | Ala | Phe | Gly | Gln | Val  | Leu | Ala | Lys | Tyr | Thr  | Lys | Ser | Gly |
|     | 1310 |     |     |     |     | 1315 |     |     |     |     | 1320 |     |     |     |
| Asn | Leu  | Asp | Ala | Phe | Leu | Asn  | Tyr | Asn | Arg | Gln | Leu  | Phe | Thr | Asn |
|     | 1325 |     |     |     |     | 1330 |     |     |     |     | 1335 |     |     |     |
| Ile | Asp  | Asn | Met | Asn | Asp | Trp  | Phe | Ile | Asp | Ala | Thr  | Glu | Asp | His |
|     | 1340 |     |     |     |     | 1345 |     |     |     |     | 1350 |     |     |     |
| Val | Tyr  | Ile | Ala | Glu | Arg | Ala  | Ser | Glu | Val | Glu | Glu  | Ile | Lys | Asn |
|     | 1355 |     |     |     |     | 1360 |     |     |     |     | 1365 |     |     |     |
| Ser | Lys  | His | Arg | Ala | Phe | Asp  | Asn | Leu | Lys | Arg | Ser  | His | Leu | Arg |
|     | 1370 |     |     |     |     | 1375 |     |     |     |     | 1380 |     |     |     |
| Asn | Thr  | Ile | Leu | Pro | Leu | Leu  | Asn | Ile | Asp | Lys | Ala  | His | Leu | Tyr |
|     | 1385 |     |     |     |     | 1390 |     |     |     |     | 1395 |     |     |     |
| Leu | Ile  | Ser | Asn | Tyr | Asn | Ala  | Ile | Ala | Phe | Gly | Ser  | Ala | Glu | Arg |
|     | 1400 |     |     |     |     | 1405 |     |     |     |     | 1410 |     |     |     |
| Leu | Gly  | Lys | Lys | Ser | Leu | Glu  | Asp | Ile | Lys | Asp | Ile  | Val | Asn | Lys |
|     | 1415 |     |     |     |     | 1420 |     |     |     |     | 1425 |     |     |     |
| Ala | Ala  | Asp | Gly | Tyr | Arg | Asn  | Tyr | Tyr | Asp | Phe | Trp  | Tyr | Arg | Leu |
|     | 1430 |     |     |     |     | 1435 |     |     |     |     | 1440 |     |     |     |
| Ala | Ser  | Asp | Asn | Val | Lys | Gln  | Arg | Leu | Leu | Arg | Asp  | Ala | Val | Ile |
|     | 1445 |     |     |     |     | 1450 |     |     |     |     | 1455 |     |     |     |
| Pro | Ile  | Trp | Glu | Gly | Tyr | Asn  | Ala | Pro | Gly | Gly | Trp  | Val | Glu | Lys |
|     | 1460 |     |     |     |     | 1465 |     |     |     |     | 1470 |     |     |     |
| Tyr | Gly  | Arg | Tyr | Asn | Thr | Asp  | Lys | Val | Tyr | Thr | Pro  | Leu | Arg | Glu |
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| Phe | Phe  | Gly | Pro | Met | Asp | Lys  | Tyr | Tyr | Asn | Tyr | Asn  | Gly | Thr | Gly |
|     | 1490 |     |     |     |     | 1495 |     |     |     |     | 1500 |     |     |     |
| Ala | Tyr  | Ala | Ala | Ile | Tyr | Pro  | Asn | Ser | Asp | Asp | Ile  | Arg | Thr | Asp |
|     | 1505 |     |     |     |     | 1510 |     |     |     |     | 1515 |     |     |     |
| Val | Lys  | Tyr | Val | His | Leu | Glu  | Met | Val | Gly | Glu | Tyr  | Gly | Ile | Ser |
|     | 1520 |     |     |     |     | 1525 |     |     |     |     | 1530 |     |     |     |
| Val | Tyr  | Thr | His | Glu | Thr | Thr  | His | Val | Asn | Asp | Arg  | Ala | Ile | Tyr |
|     | 1535 |     |     |     |     | 1540 |     |     |     |     | 1545 |     |     |     |
| Leu | Gly  | Gly | Phe | Gly | His | Arg  | Glu | Gly | Thr | Asp | Ala  | Glu | Ala | Tyr |
|     | 1550 |     |     |     |     | 1555 |     |     |     |     | 1560 |     |     |     |
| Ala | Gln  | Gly | Met | Leu | Gln | Thr  | Pro | Val | Thr | Gly | Ser  | Gly | Phe | Asp |
|     | 1565 |     |     |     |     | 1570 |     |     |     |     | 1575 |     |     |     |
| Glu | Phe  | Gly | Ser | Leu | Gly | Ile  | Asn | Met | Val | Phe | Lys  | Arg | Lys | Asn |
|     | 1580 |     |     |     |     | 1585 |     |     |     |     | 1590 |     |     |     |
| Asp | Gly  | Asn | Gln | Trp | Tyr | Ile  | Thr | Asp | Pro | Lys | Thr  | Leu | Lys | Thr |
|     | 1595 |     |     |     |     | 1600 |     |     |     |     | 1605 |     |     |     |
| Arg | Glu  | Asp | Ile | Asn | Arg | Tyr  | Met | Lys | Gly | Tyr | Asn  | Asp | Thr | Leu |
|     | 1610 |     |     |     |     | 1615 |     |     |     |     | 1620 |     |     |     |
| Thr | Leu  | Leu | Asp | Glu | Ile | Glu  | Ala | Glu | Ser | Val | Ile  | Ser | Gln | Gln |
|     | 1625 |     |     |     |     | 1630 |     |     |     |     | 1635 |     |     |     |
| Asn | Lys  | Asp | Leu | Asn | Ser | Ala  | Trp | Phe | Lys | Lys | Ile  | Asp | Arg | Glu |
|     | 1640 |     |     |     |     | 1645 |     |     |     |     | 1650 |     |     |     |
| Tyr | Arg  | Asp | Asn | Asn | Lys | Leu  | Asn | Gln | Trp | Asp | Lys  | Ile | Arg | Asn |
|     | 1655 |     |     |     |     | 1660 |     |     |     |     | 1665 |     |     |     |
| Leu | Ser  | Gln | Glu | Glu | Lys | Asn  | Glu | Leu | Asn | Ile | Gln  | Ser | Val | Asn |
|     | 1670 |     |     |     |     | 1675 |     |     |     |     | 1680 |     |     |     |
| Asp | Leu  | Val | Asp | Gln | Gln | Leu  | Met | Thr | Asn | Arg | Asn  | Pro | Gly | Asn |
|     | 1685 |     |     |     |     | 1690 |     |     |     |     | 1695 |     |     |     |
| Gly | Ile  | Tyr | Lys | Pro | Glu | Ala  | Ile | Ser | Tyr | Asn | Asp  | Gln | Ser | Pro |
|     | 1700 |     |     |     |     | 1705 |     |     |     |     | 1710 |     |     |     |
| Tyr | Val  | Gly | Val | Arg | Met | Met  | Thr | Gly | Ile | Tyr | Gly  | Gly | Asn | Thr |
|     | 1715 |     |     |     |     | 1720 |     |     |     |     | 1725 |     |     |     |

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Ser Lys Gly Ala Pro Gly Ala Val Ser Phe Lys His Asn Ala Phe  
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1745 1750 1755

Ala Ser Asn Lys Tyr Lys Gln Gln Ser Lys Thr Asp Gly Glu Ser  
1760 1765 1770

Val Leu Ser Asp Glu Tyr Ile Ile Lys Lys Ile Ser Asn Asn Thr  
1775 1780 1785

Phe Asn Thr Ile Glu Glu Phe Lys Lys Ala Tyr Phe Lys Glu Val  
1790 1795 1800

Lys Asp Lys Ala Thr Lys Gly Leu Thr Thr Phe Glu Val Asn Gly  
1805 1810 1815

Ser Ser Val Ser Ser Tyr Asp Asp Leu Leu Thr Leu Phe Lys Glu  
1820 1825 1830

Ala Val Lys Lys Asp Ala Glu Thr Leu Lys Gln Glu Ala Asn Gly  
1835 1840 1845

Asn Lys Thr Val Ser Met Asn Asn Thr Val Lys Leu Lys Glu Ala  
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1865 1870 1875

Ile Phe Lys  
1880

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Val Lys Asn Ala Trp Gln Gly Ser Tyr Tyr Leu Lys Ala Asp Gly Lys  
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Met Ala Gln Ser Glu Trp Ile Tyr Asp Ser Ser Tyr Gln Ala Trp Tyr  
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Tyr Leu Lys Ser Asp Gly Ser Tyr Ala Lys Asn Ala Trp Gln Gly Ala  
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Tyr Tyr Leu Lys Ser Asn Gly Lys Met Ala Gln Gly Glu Trp Val Tyr  
165 170 175

Asp Ser Ser Tyr Gln Ala Trp Tyr Tyr Leu Lys Ser Asp Gly Ser Tyr  
180 185 190

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195 200 205

Met Ala Lys Gly Glu Trp Val Tyr Asp Ala Thr Tyr Gln Ala Trp Tyr  
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Tyr Tyr Leu Lys Ser Asp Gly Lys Met Ala Val Asn Glu Trp Val Asp  
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290

295

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Leu Ala Lys Ser Gly Glu Ser Ala Ala Arg Leu Leu Asp Lys Leu Gly  
20 25 30

Ala Ile Val Thr Val Asn Asp Gly Lys Pro Phe Glu Asp Asn Pro Ala  
35 40 45

Ala Gln Ser Leu Leu Glu Glu Gly Ile Lys Val Ile Thr Gly Gly His  
50 55 60

Pro Leu Glu Leu Leu Asp Glu Glu Phe Ala Leu Met Val Lys Asn Pro  
65 70 75 80

Gly Ile Pro Tyr Asn Asn Pro Met Ile Glu Lys Ala Leu Ala Lys Gly  
85 90 95

Ile Pro Val Leu Thr Glu Val Glu Leu Ala Tyr Leu Ile Ser Glu Ala  
100 105 110

Pro Ile Ile Gly Ile Thr Gly Ser Asn Gly Lys Thr Thr Thr Thr Thr  
115 120 125

Met Ile Gly Glu Val Leu Thr Ala Ala Gly Gln His Gly Leu Leu Ser  
130 135 140

Gly Asn Ile Gly Tyr Pro Ala Ser Gln Val Ala Gln Ile Ala Ser Asp  
145 150 155 160

Lys Asp Thr Leu Val Met Glu Leu Ser Ser Phe Gln Leu Met Gly Val  
165 170 175

Gln Glu Phe His Pro Glu Ile Ala Val Ile Thr Asn Leu Met Pro Thr

180 185 190  
 His Ile Asp Tyr His Gly Ser Phe Ser Glu Tyr Val Ala Ala Lys Trp  
 195 200 205  
 Asn Ile Gln Asn Lys Met Thr Ala Ala Asp Phe Leu Val Leu Asn Phe  
 210 215 220  
 Asn Gln Asp Leu Ala Lys Asp Leu Thr Ser Lys Thr Glu Ala Thr Val  
 225 230 235 240  
 Val Pro Phe Ser Thr Leu Glu Lys Val Asp Gly Ala Tyr Leu Glu Asp  
 245 250 255  
 Gly Gln Leu Tyr Phe Arg Gly Glu Val Val Met Ala Ala Asn Glu Ile  
 260 265 270  
 Gly Val Pro Gly Ser His Asn Val Glu Asn Ala Leu Ala Thr Ile Ala  
 275 280 285  
 Val Ala Lys Leu Arg Asp Val Asp Asn Gln Thr Ile Lys Glu Thr Leu  
 290 295 300  
 Ser Ala Phe Gly Gly Val Lys His Arg Leu Gln Phe Val Asp Asp Ile  
 305 310 315 320  
 Lys Gly Val Lys Phe Tyr Asn Asp Ser Lys Ser Thr Asn Ile Leu Ala  
 325 330 335  
 Thr Gln Lys Ala Leu Ser Gly Phe Asp Asn Ser Lys Val Val Leu Ile  
 340 345 350  
 Ala Gly Gly Leu Asp Arg Gly Asn Glu Phe Asp Glu Leu Val Pro Asp  
 355 360 365  
 Ile Thr Gly Leu Lys Lys Met Val Ile Leu Gly Gln Ser Ala Glu Arg  
 370 375 380  
 Val Lys Arg Ala Ala Asp Lys Ala Gly Val Ala Tyr Val Glu Ala Thr  
 385 390 395 400  
 Asp Ile Ala Asp Ala Thr Arg Lys Ala Tyr Glu Leu Ala Thr Gln Gly  
 405 410 415  
 Asp Val Val Leu Leu Ser Pro Ala Asn Ala Ser Trp Asp Met Tyr Ala  
 420 425 430

Asn Phe Glu Val Arg Gly Asp Leu Phe Ile Asp Thr Val Ala Glu Leu  
 435 440 445

Lys Glu  
 450

<210> 182  
 <211> 386  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 182

Met Lys Lys Lys Phe Ala Leu Ser Phe Val Ala Leu Ala Ser Val Ala  
 1 5 10 15

Leu Leu Ala Ala Cys Gly Glu Val Lys Ser Gly Ala Val Asn Thr Ala  
 20 25 30

Gly Asn Ser Val Glu Glu Lys Thr Ile Lys Ile Gly Phe Asn Phe Glu  
 35 40 45

Glu Ser Gly Ser Leu Ala Ala Tyr Gly Thr Ala Glu Gln Lys Gly Ala  
 50 55 60

Gln Leu Ala Val Asp Glu Ile Asn Ala Ala Gly Gly Ile Asp Gly Lys  
 65 70 75 80

Gln Ile Glu Val Val Asp Lys Asp Asn Lys Ser Glu Thr Ala Glu Ala  
 85 90 95

Ala Ser Val Thr Thr Asn Leu Val Thr Gln Ser Lys Val Ser Ala Val  
 100 105 110

Val Gly Pro Ala Thr Ser Gly Ala Thr Ala Ala Val Ala Asn Ala  
 115 120 125

Thr Lys Ala Gly Val Pro Leu Ile Ser Pro Ser Ala Thr Gln Asp Gly  
 130 135 140

Leu Thr Lys Gly Gln Asp Tyr Leu Phe Ile Gly Thr Phe Gln Asp Ser  
 145 150 155 160

Phe Gln Gly Lys Ile Ile Ser Asn Tyr Val Ser Glu Lys Leu Asn Ala  
 165 170 175

Lys Lys Val Val Leu Tyr Thr Asp Asn Ala Ser Asp Tyr Ala Lys Gly  
 180 185 190



Ile Ala Lys Ser Phe Arg Glu Ser Tyr Lys Gly Glu Ile Val Ala Asp  
 195 200 205

Glu Thr Phe Val Ala Gly Asp Thr Asp Phe Gln Ala Ala Leu Thr Lys  
 210 215 220

Met Lys Gly Lys Asp Phe Asp Ala Ile Val Val Pro Gly Tyr Tyr Asn  
 225 230 235 240

Glu Ala Gly Lys Ile Val Asn Gln Ala Arg Gly Met Gly Ile Asp Lys  
 245 250 255

Pro Ile Val Gly Gly Asp Gly Phe Asn Gly Glu Glu Phe Val Gln Gln  
 260 265 270

Ala Thr Ala Glu Lys Ala Ser Asn Ile Tyr Phe Ile Ser Gly Phe Ser  
 275 280 285

Thr Thr Val Glu Val Ser Ala Lys Ala Lys Ala Phe Leu Asp Ala Tyr  
 290 295 300

Arg Ala Lys Tyr Asn Glu Glu Pro Ser Thr Phe Ala Ala Leu Ala Tyr  
 305 310 315 320

Asp Ser Val His Leu Val Ala Asn Ala Ala Lys Gly Ala Lys Asn Ser  
 325 330 335

Gly Glu Ile Lys Asn Asn Leu Ala Lys Thr Lys Asp Phe Glu Gly Val  
 340 345 350

Thr Gly Gln Thr Ser Phe Asp Ala Asp His Asn Thr Val Lys Thr Ala  
 355 360 365

Tyr Met Met Thr Met Asn Asn Gly Lys Val Glu Ala Ala Glu Val Val  
 370 375 380

Lys Pro  
 385

<210> 183  
 <211> 513  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 183

Met Ser Ile Leu Glu Val Lys Asn Leu Ser His Gly Phe Gly Asp Arg  
 1 5 10 15

Ala Ile Phe Glu Asp Val Ser Phe Arg Leu Leu Lys Gly Glu His Ile  
 20 25 30  
 Gly Leu Val Gly Ala Asn Gly Glu Gly Lys Ser Thr Phe Met Ser Ile  
 35 40 45  
 Val Thr Gly Lys Met Leu Pro Asp Glu Gly Lys Val Glu Trp Ser Lys  
 50 55 60  
 Tyr Val Thr Ala Gly Tyr Leu Asp Gln His Ser Val Leu Ala Glu Arg  
 65 70 75 80  
 Gln Ser Val Arg Asp Val Leu Arg Thr Ala Phe Asp Glu Leu Phe Lys  
 85 90 95  
 Ala Glu Ala Arg Ile Asn Asp Leu Tyr Met Lys Met Ala Glu Asp Gly  
 100 105 110  
 Ala Asp Val Asp Ala Leu Met Glu Glu Val Gly Glu Leu Gln Asp Arg  
 115 120 125  
 Leu Glu Ser Arg Asp Phe Tyr Thr Leu Asp Ala Lys Ile Asp Glu Val  
 130 135 140  
 Ala Arg Ala Leu Gly Val Met Asp Phe Gly Met Asp Thr Asp Val Thr  
 145 150 155 160  
 Ser Leu Ser Gly Gly Gln Arg Thr Lys Val Leu Leu Ala Lys Leu Leu  
 165 170 175  
 Leu Glu Lys Pro Asp Ile Leu Leu Leu Asp Glu Pro Thr Asn Tyr Leu  
 180 185 190  
 Asp Ala Glu His Ile Asp Trp Leu Lys Arg Tyr Leu Gln Asn Tyr Glu  
 195 200 205  
 Asn Ala Phe Val Leu Ile Ser His Asp Ile Pro Phe Leu Asn Asp Val  
 210 215 220  
 Ile Asn Ile Val Tyr His Val Glu Asn Gln Gln Leu Thr Arg Tyr Ser  
 225 230 235 240  
 Gly Asp Tyr Tyr Gln Phe Gln Glu Val Tyr Ala Met Lys Lys Ser Gln  
 245 250 255  
 Leu Glu Ala Ala Tyr Glu Arg Gln Gln Lys Glu Ile Ala Asp Leu Lys  
 260 265 270

## 1028462\_1.TXT

Asp Phe Val Ala Arg Asn Lys Ala Arg Val Ala Thr Arg Asn Met Ala  
 275 280 285  
 Met Ser Arg Gln Lys Lys Leu Asp Lys Met Asp Ile Ile Glu Leu Gln  
 290 295 300  
 Ser Glu Lys Pro Lys Pro Ser Phe Asp Phe Lys Pro Ala Arg Thr Pro  
 305 310 315 320  
 Gly Arg Phe Ile Phe Gln Ala Lys Asn Leu Gln Ile Gly Tyr Asp Arg  
 325 330 335  
 Pro Leu Thr Lys Pro Leu Asn Leu Thr Phe Glu Arg Asn Gln Lys Val  
 340 345 350  
 Ala Ile Ile Gly Ala Asn Gly Ile Gly Lys Thr Thr Leu Leu Lys Ser  
 355 360 365  
 Leu Leu Gly Ile Ile Ser Pro Ile Ala Gly Glu Val Glu Arg Gly Asp  
 370 375 380  
 Tyr Leu Glu Leu Gly Tyr Phe Glu Gln Glu Val Glu Gly Gly Asn Arg  
 385 390 395 400  
 Gln Thr Pro Leu Glu Ala Val Trp Asn Ala Phe Pro Ala Leu Asn Gln  
 405 410 415  
 Ala Glu Val Arg Ala Ala Leu Ala Arg Cys Gly Leu Thr Thr Lys His  
 420 425 430  
 Ile Glu Ser Gln Ile Gln Val Leu Ser Gly Gly Glu Gln Ala Lys Val  
 435 440 445  
 Arg Phe Cys Leu Leu Met Asn Arg Glu Asn Asn Val Leu Val Leu Asp  
 450 455 460  
 Glu Pro Thr Asn His Leu Asp Val Asp Ala Lys Asp Glu Leu Lys Arg  
 465 470 475 480  
 Ala Leu Lys Glu Tyr Arg Gly Ser Ile Leu Met Val Cys His Glu Pro  
 485 490 495  
 Asp Phe Tyr Glu Gly Trp Ile Asp Gln Ile Trp Asp Phe Asn Asn Leu  
 500 505 510

Thr

1028462\_1.TXT

<210> 184  
 <211> 399  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 184

Met Lys Lys Lys Asn Gly Lys Ala Lys Lys Trp Gln Leu Tyr Ala Ala  
 1 5 10 15

Ile Gly Ala Ala Ser Val Val Val Leu Gly Ala Gly Gly Ile Leu Leu  
 20 25 30

Phe Arg Gln Pro Ser Gln Thr Ala Leu Lys Asp Glu Pro Thr His Leu  
 35 40 45

Val Val Ala Lys Glu Gly Ser Val Ala Ser Ser Val Leu Leu Ser Gly  
 50 55 60

Thr Val Thr Ala Lys Asn Glu Gln Tyr Val Tyr Phe Asp Ala Ser Lys  
 65 70 75 80

Gly Asp Leu Asp Glu Ile Leu Val Ser Val Gly Asp Lys Val Ser Glu  
 85 90 95

Gly Gln Ala Leu Val Lys Tyr Ser Ser Ser Glu Ala Gln Ala Ala Tyr  
 100 105 110

Asp Ser Ala Ser Arg Ala Val Ala Arg Ala Asp Arg His Ile Asn Glu  
 115 120 125

Leu Asn Gln Ala Arg Asn Glu Ala Ala Ser Ala Pro Ala Pro Gln Leu  
 130 135 140

Pro Ala Pro Val Gly Gly Glu Asp Ala Thr Val Gln Ser Pro Thr Pro  
 145 150 155 160

Val Ala Gly Asn Ser Val Ala Ser Ile Asp Ala Gln Leu Gly Asp Ala  
 165 170 175

Arg Asp Ala Arg Ala Asp Ala Ala Ala Gln Leu Ser Lys Ala Gln Ser  
 180 185 190

Gln Leu Asp Ala Thr Thr Val Leu Ser Thr Leu Glu Gly Thr Val Val  
 195 200 205

Glu Val Asn Ser Asn Val Ser Lys Ser Pro Thr Gly Ala Ser Gln Val  
 210 215 220

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Met Val His Ile Val Ser Asn Glu Asn Leu Gln Val Lys Gly Glu Leu  
225 230 235 240

Ser Glu Tyr Asn Leu Ala Asn Leu Ser Val Gly Gln Glu Val Ser Phe  
245 250 255

Thr Ser Lys Val Tyr Pro Asp Lys Lys Trp Thr Gly Lys Leu Ser Tyr  
260 265 270

Ile Ser Asp Tyr Pro Lys Asn Asn Gly Glu Ala Ala Ser Pro Ala Ala  
275 280 285

Gly Asn Asn Thr Gly Ser Lys Tyr Pro Tyr Thr Ile Asp Val Thr Gly  
290 295 300

Glu Val Gly Asp Leu Lys Gln Gly Phe Ser Val Asn Ile Glu Val Lys  
305 310 315 320

Ser Lys Thr Lys Ala Ile Leu Val Pro Val Ser Ser Leu Val Met Asp  
325 330 335

Asp Ser Lys Asn Tyr Val Trp Ile Val Asp Glu Gln Gln Lys Ala Lys  
340 345 350

Lys Val Glu Val Ser Leu Gly Asn Ala Asp Ala Glu Asn Gln Glu Ile  
355 360 365

Thr Ser Gly Leu Thr Asn Gly Ala Lys Val Ile Ser Asn Pro Thr Ser  
370 375 380

Ser Leu Glu Glu Gly Lys Glu Val Lys Ala Asp Glu Ala Thr Asn  
385 390 395

<210> 185  
<211> 230  
<212> PRT  
<213> Streptococcus pneumoniae  
<400> 185

Ser Glu Thr Asn His Glu Ile Asp Ser Asn Phe Ala Gly Arg Leu Asn  
1 5 10 15

Ile Leu Arg Ala Gly Val Leu Asp Ala Asn Asp Gly Ile Ile Ser Ile  
20 25 30

Ala Gly Val Val Ile Gly Val Ala Ser Ala Thr Thr Asn Ile Trp Ile  
35 40 45

1028462\_1.TXT

Ile Phe Leu Ser Gly Phe Thr Ala Ile Leu Ala Gly Ala Phe Ser Met  
50 55 60

Ala Gly Gly Glu Tyr Val Ser Val Ser Thr Pro Lys Asp Thr Glu Glu  
65 70 75 80

Ala Ala Val Ser Arg Glu Lys Leu Leu Leu Asp Gln Asp Arg Glu Leu  
85 90 95

Ala Lys Lys Ser Leu Tyr Ala Ala Tyr Ile Gln Asn Gly Glu Phe Lys  
100 105 110

Thr Ser Ala Gln Leu Leu Thr Asn Lys Ile Phe Leu Lys Asn Pro Leu  
115 120 125

Lys Ala Leu Val Glu Glu Lys Tyr Gly Ile Glu Tyr Glu Glu Phe Thr  
130 135 140

Asn Pro Trp His Ala Ala Ile Ser Ser Phe Val Ala Phe Phe Leu Arg  
145 150 155 160

Ser Leu Pro Pro Met Leu Ser Val Thr Ile Phe Pro Ser Asp Tyr Arg  
165 170 175

Ile Pro Ala Thr Val Leu Ile Val Gly Val Ala Leu Leu Leu Thr Gly  
180 185 190

Tyr Thr Ser Ala Arg Leu Gly Lys Ala Pro Thr Lys Thr Ala Met Ile  
195 200 205

Arg Asn Leu Ala Ile Gly Leu Leu Thr Met Gly Val Thr Phe Leu Leu  
210 215 220

Gly Gln Leu Phe Ser Ile  
225 230

<210> 186  
<211> 627  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 186

Met Lys Lys Lys Leu Thr Ser Leu Ala Leu Val Gly Ala Phe Leu Gly  
1 5 10 15

Leu Ser Trp Tyr Gly Asn Val Gln Ala Gln Glu Ser Ser Gly Asn Lys  
20 25 30

1028462\_1.TXT

Ile His Phe Ile Asn Val Gln Glu Gly Gly Ser Asp Ala Ile Ile Leu  
35 40 45

Glu Ser Asn Gly His Phe Ala Met Val Asp Thr Gly Glu Asp Tyr Asp  
50 55 60

Phe Pro Asp Gly Ser Asp Ser Arg Tyr Pro Trp Arg Glu Gly Ile Glu  
65 70 75 80

Thr Ser Tyr Lys His Val Leu Thr Asp Arg Val Phe Arg Arg Leu Lys  
85 90 95

Glu Leu Gly Val Gln Lys Leu Asp Phe Ile Leu Val Thr His Thr His  
100 105 110

Ser Asp His Ile Gly Asn Val Asp Glu Leu Leu Ser Thr Tyr Pro Val  
115 120 125

Asp Arg Val Tyr Leu Lys Lys Tyr Ser Asp Ser Arg Ile Thr Asn Ser  
130 135 140

Glu Arg Leu Trp Asp Asn Leu Tyr Gly Tyr Asp Lys Val Leu Gln Thr  
145 150 155 160

Ala Ala Glu Lys Gly Val Ser Val Ile Gln Asn Ile Thr Gln Gly Asp  
165 170 175

Ala His Phe Gln Phe Gly Asp Met Asp Ile Gln Leu Tyr Asn Tyr Glu  
180 185 190

Asn Glu Thr Asp Ser Ser Gly Glu Leu Lys Lys Ile Trp Asp Asp Asn  
195 200 205

Ser Asn Ser Leu Ile Ser Val Val Lys Val Asn Gly Lys Lys Ile Tyr  
210 215 220

Leu Gly Gly Asp Leu Asp Asn Val His Gly Ala Glu Asp Lys Tyr Gly  
225 230 235 240

Pro Leu Ile Gly Lys Val Asp Leu Met Lys Phe Asn His His His Asp  
245 250 255

Thr Asn Lys Ser Asn Thr Lys Asp Phe Ile Lys Asn Leu Ser Pro Ser  
260 265 270

Leu Ile Val Gln Thr Ser Asp Ser Leu Pro Trp Lys Asn Gly Val Asp

275                                      280                                      285  
 Ser Glu Tyr Val Asn Trp Leu Lys Glu Arg Gly Ile Glu Arg Ile Asn  
   290                                      295                                      300  
 Ala Ala Ser Lys Asp Tyr Asp Ala Thr Val Phe Asp Ile Arg Lys Asp  
   305                                      310                                      315                                      320  
 Gly Phe Val Asn Ile Ser Thr Ser Tyr Lys Pro Ile Pro Ser Phe Gln  
                                     325                                      330                                      335  
 Ala Gly Trp His Lys Ser Ala Tyr Gly Asn Trp Trp Tyr Gln Ala Pro  
                                     340                                      345                                      350  
 Asp Ser Thr Gly Glu Tyr Ala Val Gly Trp Asn Glu Ile Glu Gly Glu  
                                     355                                      360                                      365  
 Trp Tyr Tyr Phe Asn Gln Thr Gly Ile Leu Leu Gln Asn Gln Trp Lys  
                                     370                                      375                                      380  
 Lys Trp Asn Asn His Trp Phe Tyr Leu Thr Asp Ser Gly Ala Ser Ala  
   385                                      390                                      395                                      400  
 Lys Asn Trp Lys Lys Ile Ala Gly Ile Trp Tyr Tyr Phe Asn Lys Glu  
                                     405                                      410                                      415  
 Asn Gln Met Glu Ile Gly Trp Ile Gln Asp Lys Glu Gln Trp Tyr Tyr  
                                     420                                      425                                      430  
 Leu Asp Val Asp Gly Ser Met Lys Thr Gly Trp Leu Gln Tyr Met Gly  
                                     435                                      440                                      445  
 Gln Trp Tyr Tyr Phe Ala Pro Ser Gly Glu Met Lys Met Gly Trp Val  
                                     450                                      455                                      460  
 Lys Asp Lys Glu Thr Trp Tyr Tyr Met Asp Ser Thr Gly Val Met Lys  
   465                                      470                                      475                                      480  
 Thr Gly Glu Ile Glu Val Ala Gly Gln His Tyr Tyr Leu Glu Asp Ser  
                                     485                                      490                                      495  
 Gly Ala Met Lys Gln Gly Trp His Lys Lys Ala Asn Asp Trp Tyr Phe  
                                     500                                      505                                      510  
 Tyr Lys Thr Asp Gly Ser Arg Ala Val Gly Trp Ile Lys Asp Lys Asp  
                                     515                                      520                                      525



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Lys Trp Tyr Phe Leu Lys Glu Asn Gly Gln Leu Leu Val Asn Gly Lys  
530 535 540

Thr Pro Glu Gly Tyr Thr Val Asp Ser Ser Gly Ala Trp Leu Val Asp  
545 550 555 560

Val Ser Ile Glu Lys Ser Ala Thr Ile Lys Thr Thr Ser His Ser Glu  
565 570 575

Ile Lys Glu Ser Lys Glu Val Val Lys Lys Asp Leu Glu Asn Lys Glu  
580 585 590

Thr Ser Gln His Glu Ser Val Thr Asn Phe Ser Thr Ser Gln Asp Leu  
595 600 605

Thr Ser Ser Thr Ser Gln Ser Ser Glu Thr Ser Val Asn Lys Ser Glu  
610 615 620

Ser Glu Gln  
625

<210> 187  
<211> 456  
<212> PRT  
<213> Streptococcus pneumoniae  
<400> 187

Met Asp Leu Gly Pro Thr Gln Arg Gly Ile Ser Val Val Ser Gln Ser  
1 5 10 15

Tyr Ile Asn Val Ile Gly Ala Gly Leu Ala Gly Ser Glu Ala Ala Tyr  
20 25 30

Gln Ile Ala Glu Arg Gly Ile Pro Val Lys Leu Tyr Glu Met Arg Gly  
35 40 45

Val Lys Ser Thr Pro Gln His Lys Thr Asp Asn Phe Ala Glu Leu Val  
50 55 60

Cys Ser Asn Ser Leu Arg Gly Asp Ala Leu Thr Asn Ala Val Gly Leu  
65 70 75 80

Leu Lys Glu Glu Met Arg Arg Leu Gly Ser Val Ile Leu Glu Ser Ala  
85 90 95

Glu Ala Thr Arg Val Pro Ala Gly Gly Ala Leu Ala Val Asp Arg Asp  
100 105 110

Gly Phe Ser Gln Met Val Thr Glu Lys Val Ala Asn His Pro Leu Ile  
 115 120 125  
 Glu Val Val Arg Asp Glu Ile Thr Glu Leu Pro Thr Asp Val Ile Thr  
 130 135 140  
 Val Ile Ala Thr Gly Pro Leu Thr Ser Asp Ala Leu Ala Glu Lys Ile  
 145 150 155 160  
 His Ala Leu Asn Asp Gly Ala Gly Phe Tyr Phe Tyr Asp Ala Ala Ala  
 165 170 175  
 Pro Ile Ile Asp Val Asn Thr Ile Asp Met Ser Lys Val Tyr Leu Lys  
 180 185 190  
 Ser Arg Tyr Asp Lys Gly Glu Ala Ala Tyr Leu Asn Ala Pro Met Thr  
 195 200 205  
 Lys Gln Glu Phe Met Asp Phe His Glu Ala Leu Val Asn Ala Glu Glu  
 210 215 220  
 Ala Pro Leu Ser Ser Phe Glu Lys Glu Lys Tyr Phe Glu Gly Cys Met  
 225 230 235 240  
 Pro Ile Glu Val Met Ala Lys Arg Gly Ile Lys Thr Met Leu Tyr Gly  
 245 250 255  
 Pro Met Lys Pro Val Gly Leu Glu Tyr Pro Asp Asp Tyr Thr Gly Pro  
 260 265 270  
 Arg Asp Gly Glu Phe Lys Thr Pro Tyr Ala Val Val Gln Leu Arg Gln  
 275 280 285  
 Asp Asn Ala Ala Gly Ser Leu Tyr Asn Ile Val Gly Phe Gln Thr His  
 290 295 300  
 Leu Lys Trp Gly Glu Gln Lys Arg Val Phe Gln Met Ile Pro Gly Leu  
 305 310 315 320  
 Glu Asn Ala Glu Phe Val Arg Tyr Gly Val Met His Arg Asn Ser Tyr  
 325 330 335  
 Met Asp Ser Pro Asn Leu Leu Glu Gln Thr Tyr Arg Ser Lys Lys Gln  
 340 345 350  
 Pro Asn Leu Phe Phe Ala Gly Gln Met Thr Gly Val Glu Gly Tyr Val  
 355 360 365

1028462\_1.TXT

Glu Ser Ala Ala Ser Gly Leu Val Ala Gly Ile Asn Ala Ala Arg Leu  
370 375 380

Phe Lys Glu Glu Ser Glu Ala Ile Phe Pro Glu Thr Thr Ala Ile Gly  
385 390 395 400

Ser Leu Ala His Tyr Ile Thr His Ala Asp Ser Lys His Phe Gln Pro  
405 410 415

Met Asn Val Asn Phe Gly Ile Ile Lys Glu Leu Glu Gly Glu Arg Ile  
420 425 430

Arg Asp Lys Lys Ala Arg Tyr Glu Lys Ile Ala Glu Arg Ala Leu Ala  
435 440 445

Asp Leu Glu Glu Phe Leu Thr Val  
450 455

<210> 188  
<211> 360  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 188

Met Leu Ile Gly Ile Pro Lys Glu Ile Lys Asn Asn Glu Asn Arg Val  
1 5 10 15

Ala Leu Thr Pro Ala Gly Val His Ser Leu Val Ser Arg Gly His Arg  
20 25 30

Val Leu Ile Glu Thr Asn Ala Gly Leu Gly Ser Gly Phe Thr Asp Ala  
35 40 45

Asp Tyr Gln Lys Gln Gly Ala Glu Ile Val Ala Thr Ala Gly Glu Ala  
50 55 60

Trp Ala Ala Glu Leu Val Val Lys Val Lys Glu Ser Leu Ser Ser Glu  
65 70 75 80

Tyr Gly Tyr Leu Arg Asp Asp Leu Leu Leu Phe Thr Tyr Leu His Met  
85 90 95

Ala Ala Ala Pro Glu Leu Ala Asp Ala Met Leu Thr Ala Lys Thr Thr  
100 105 110

Glu Thr Val Arg Asp Asn Gln Gly Gln Leu Pro Leu Leu Val Pro Met  
115 120 125

## 1028462\_1.TXT

Ser Glu Val Ala Gly Arg Met Ala Val Gln Ile Gly Ala His Phe Leu  
 130 135 140  
 Thr Lys Gln Ala Gly Gly Ser Gly Val Leu Leu Gly Gly Val Pro Gly  
 145 150 155 160  
 Val Pro Lys Gly Lys Val Thr Ile Ile Gly Gly Gly Val Val Gly Thr  
 165 170 175  
 His Ala Ala Arg Ile Ala Leu Gly Leu Gly Ala Gln Val Thr Ile Leu  
 180 185 190  
 Asp Ile Ser Ser Lys Arg Leu Ser Val Leu Glu Glu Val Phe Gly Ser  
 195 200 205  
 Gln Ile Gln Thr Leu Met Ser Asn Ser Phe Asn Ile Glu Ala Ser Val  
 210 215 220  
 Arg Asp Ala Asp Val Val Ile Gly Ala Ile Leu Ile Pro Gly Ala Lys  
 225 230 235 240  
 Ala Pro Glu Leu Val Thr Asp Glu Met Val Lys Gln Met Arg Pro Gly  
 245 250 255  
 Ser Val Ser Leu Thr Leu Leu Leu Thr Lys Val Ala Leu Ser Lys Gln  
 260 265 270  
 Leu Thr Val Gln Arg Thr Met Asn Pro Ser Met Lys Asn Thr Val Phe  
 275 280 285  
 Ser Thr Met Pro Leu Pro Ile Ser Leu Val Arg Leu Leu Ala Leu Gln  
 290 295 300  
 Pro Ser Pro Pro Met Ser Leu Phe Leu Ile Ser Lys Leu Trp Leu Ala  
 305 310 315 320  
 Lys Asp Ser His Lys Gln Ser Leu Lys Met Lys Ala Cys Val Lys Val  
 325 330 335  
 Leu Leu Ile Lys Val Thr Leu Thr Tyr Gln Leu Leu Lys Asp Leu Ile  
 340 345 350  
 Val Thr Thr Leu Ile Ser Met Ile  
 355 360

<210> 189  
 <211> 839

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 189

Met Lys Ile Asn Lys Lys Tyr Leu Ala Gly Ser Val Ala Val Leu Ala  
 1 5 10 15

Leu Ser Val Cys Ser Tyr Glu Leu Gly Arg His Gln Ala Gly Gln Val  
 20 25 30

Lys Lys Glu Ser Asn Arg Val Ser Tyr Ile Asp Gly Asp Gln Ala Gly  
 35 40 45

Gln Lys Ala Glu Asn Leu Thr Pro Asp Glu Val Ser Lys Arg Glu Gly  
 50 55 60

Ile Asn Ala Glu Gln Ile Val Ile Lys Ile Thr Asp Gln Gly Tyr Val  
 65 70 75 80

Thr Ser His Gly Asp His Tyr His Tyr Tyr Asn Gly Lys Val Pro Tyr  
 85 90 95

Asp Ala Ile Ile Ser Glu Glu Leu Leu Met Lys Asp Pro Asn Tyr Gln  
 100 105 110

Leu Lys Asp Ser Asp Ile Val Asn Glu Ile Lys Gly Gly Tyr Val Ile  
 115 120 125

Lys Val Asp Gly Lys Tyr Tyr Val Tyr Leu Lys Asp Ala Ala His Ala  
 130 135 140

Asp Asn Ile Arg Thr Lys Glu Glu Ile Lys Arg Gln Lys Gln Glu His  
 145 150 155 160

Ser His Asn His Gly Gly Gly Ser Asn Asp Gln Ala Val Val Ala Ala  
 165 170 175

Arg Ala Gln Gly Arg Tyr Thr Thr Asp Asp Gly Tyr Ile Phe Asn Ala  
 180 185 190

Ser Asp Ile Ile Glu Asp Thr Gly Asp Ala Tyr Ile Val Pro His Gly  
 195 200 205

Asp His Tyr His Tyr Ile Pro Lys Asn Glu Leu Ser Ala Ser Glu Leu  
 210 215 220

Ala Ala Ala Glu Ala Tyr Trp Asn Gly Lys Gln Gly Ser Arg Pro Ser  
 225 230 235 240

1028462\_1.TXT

Ser Ser Ser Ser Tyr Asn Ala Asn Pro Ala Gln Pro Arg Leu Ser Glu  
245 250 255

Asn His Asn Leu Thr Val Thr Pro Thr Tyr His Gln Asn Gln Gly Glu  
260 265 270

Asn Ile Ser Ser Leu Leu Arg Glu Leu Tyr Ala Lys Pro Leu Ser Glu  
275 280 285

Arg His Val Glu Ser Asp Gly Leu Ile Phe Asp Pro Ala Gln Ile Thr  
290 295 300

Ser Arg Thr Ala Arg Gly Val Ala Val Pro His Gly Asn His Tyr His  
305 310 315 320

Phe Ile Pro Tyr Glu Gln Met Ser Glu Leu Glu Lys Arg Ile Ala Arg  
325 330 335

Ile Ile Pro Leu Arg Tyr Arg Ser Asn His Trp Val Pro Asp Ser Arg  
340 345 350

Pro Glu Gln Pro Ser Pro Gln Ser Thr Pro Glu Pro Ser Pro Ser Pro  
355 360 365

Gln Pro Ala Pro Asn Pro Gln Pro Ala Pro Ser Asn Pro Ile Asp Glu  
370 375 380

Lys Leu Val Lys Glu Ala Val Arg Lys Val Gly Asp Gly Tyr Val Phe  
385 390 395 400

Glu Glu Asn Gly Val Ser Arg Tyr Ile Pro Ala Lys Asp Leu Ser Ala  
405 410 415

Glu Thr Ala Ala Gly Ile Asp Ser Lys Leu Ala Lys Gln Glu Ser Leu  
420 425 430

Ser His Lys Leu Gly Ala Lys Lys Thr Asp Leu Pro Ser Ser Asp Arg  
435 440 445

Glu Phe Tyr Asn Lys Ala Tyr Asp Leu Leu Ala Arg Ile His Gln Asp  
450 455 460

Leu Leu Asp Asn Lys Gly Arg Gln Val Asp Phe Glu Ala Leu Asp Asn  
465 470 475 480

Leu Leu Glu Arg Leu Lys Asp Val Pro Ser Asp Lys Val Lys Leu Val

Asp Asp Ile Leu Ala Phe Leu Ala Pro Ile Arg His Pro Glu Arg Leu  
500 505 510

Gly Lys Pro Asn Ala Gln Ile Thr Tyr Thr Asp Asp Glu Ile Gln Val  
515 520 525

Ala Lys Leu Ala Gly Lys Tyr Thr Thr Glu Asp Gly Tyr Ile Phe Asp  
530 535 540

Pro Arg Asp Ile Thr Ser Asp Glu Gly Asp Ala Tyr Val Thr Pro His  
545 550 555 560

Met Thr His Ser His Trp Ile Lys Lys Asp Ser Leu Ser Glu Ala Glu  
565 570 575

Arg Ala Ala Ala Gln Ala Tyr Ala Lys Glu Lys Gly Leu Thr Pro Pro  
580 585 590

Ser Thr Asp His Gln Asp Ser Gly Asn Thr Glu Ala Lys Gly Ala Glu  
595 600 605

Ala Ile Tyr Asn Arg Val Lys Ala Ala Lys Lys Val Pro Leu Asp Arg  
610 615 620

Met Pro Tyr Asn Leu Gln Tyr Thr Val Glu Val Lys Asn Gly Ser Leu  
625 630 635 640

Ile Ile Pro His Tyr Asp His Tyr His Asn Ile Lys Phe Glu Trp Phe  
645 650 655

Asp Glu Gly Leu Tyr Glu Ala Pro Lys Gly Tyr Thr Leu Glu Asp Leu  
660 665 670

Leu Ala Thr Val Lys Tyr Tyr Val Glu His Pro Asn Glu Arg Pro His  
675 680 685

Ser Asp Asn Gly Phe Gly Asn Ala Ser Asp His Val Arg Lys Asn Lys  
690 695 700

Val Asp Gln Asp Ser Lys Pro Asp Glu Asp Lys Glu His Asp Glu Val  
705 710 715 720

Ser Glu Pro Thr His Pro Glu Ser Asp Glu Lys Glu Asn His Ala Gly  
725 730 735

1028462\_1.TXT

Leu Asn Pro Ser Ala Asp Asn Leu Tyr Lys Pro Ser Thr Asp Thr Glu  
740 745 750

Glu Thr Glu Glu Glu Ala Glu Asp Thr Thr Asp Glu Ala Glu Ile Pro  
755 760 765

Gln Val Glu Asn Ser Val Ile Asn Ala Lys Ile Ala Asp Ala Glu Ala  
770 775 780

Leu Leu Glu Lys Val Thr Asp Pro Ser Ile Arg Gln Asn Ala Met Glu  
785 790 795 800

Thr Leu Thr Gly Leu Lys Ser Ser Leu Leu Leu Gly Thr Lys Asp Asn  
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Asn Thr Ile Ser Ala Glu Val Asp Ser Leu Leu Ala Leu Leu Lys Glu  
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Gln Lys Ser Glu Asn Leu Thr Pro Asp Gln Val Ser Gln Lys Glu Gly  
50 55 60

Ile Gln Ala Glu Gln Ile Val Ile Lys Ile Thr Asp Gln Gly Tyr Val  
65 70 75 80

Thr Ser His Gly Asp His Tyr His Tyr Tyr Asn Gly Lys Val Pro Tyr  
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Asp Ala Leu Phe Ser Glu Glu Leu Leu Met Lys Asp Pro Asn Tyr Gln  
100 105 110



Leu Lys Asp Ala Asp Ile Val Asn Glu Val Lys Gly Gly Tyr Ile Ile  
 115 120 125  
 Lys Val Asp Gly Lys Tyr Tyr Val Tyr Leu Lys Asp Ala Ala His Ala  
 130 135 140  
 Asp Asn Val Arg Thr Lys Asp Glu Ile Asn Arg Gln Lys Gln Glu His  
 145 150 155 160  
 Val Lys Asp Asn Glu Lys Val Asn Ser Asn Val Ala Val Ala Arg Ser  
 165 170 175  
 Gln Gly Arg Tyr Thr Thr Asn Asp Gly Tyr Val Phe Asn Pro Ala Asp  
 180 185 190  
 Ile Ile Glu Asp Thr Gly Asn Ala Tyr Ile Val Pro His Gly Gly His  
 195 200 205  
 Tyr His Tyr Ile Pro Lys Ser Asp Leu Ser Ala Ser Glu Leu Ala Ala  
 210 215 220  
 Ala Lys Ala His Leu Ala Gly Lys Asn Met Gln Pro Ser Gln Leu Ser  
 225 230 235 240  
 Tyr Ser Ser Thr Ala Ser Asp Asn Asn Thr Gln Ser Val Ala Lys Gly  
 245 250 255  
 Ser Thr Ser Lys Pro Ala Asn Lys Ser Glu Asn Leu Gln Ser Leu Leu  
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 Lys Glu Leu Tyr Asp Ser Pro Ser Ala Gln Arg Tyr Ser Glu Ser Asp  
 275 280 285  
 Gly Leu Val Phe Asp Pro Ala Lys Ile Ile Ser Arg Thr Pro Asn Gly  
 290 295 300  
 Val Ala Ile Pro His Gly Asp His Tyr His Phe Ile Pro Tyr Ser Lys  
 305 310 315 320  
 Leu Ser Ala Leu Glu Glu Lys Ile Ala Arg Met Val Pro Ile Ser Gly  
 325 330 335  
 Thr Gly Ser Thr Val Ser Thr Asn Ala Lys Pro Asn Glu Val Val Ser  
 340 345 350  
 Ser Leu Gly Ser Leu Ser Ser Asn Pro Ser Ser Leu Thr Thr Ser Lys  
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Glu Leu Ser Ser Ala Ser Asp Gly Tyr Ile Phe Asn Pro Lys Asp Ile  
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 Val Glu Glu Thr Ala Thr Ala Tyr Ile Val Arg His Gly Asp His Phe  
 385 390 395 400  
 His Tyr Ile Pro Lys Ser Asn Gln Ile Gly Gln Pro Thr Leu Pro Asn  
 405 410 415  
 Asn Ser Leu Ala Thr Pro Ser Pro Ser Leu Pro Ile Asn Pro Gly Thr  
 420 425 430  
 Ser His Glu Lys His Glu Glu Asp Gly Tyr Gly Phe Asp Ala Asn Arg  
 435 440 445  
 Ile Ile Ala Glu Asp Glu Ser Gly Phe Val Met Ser His Gly Asp His  
 450 455 460  
 Asn His Tyr Phe Phe Lys Lys Asp Leu Thr Glu Glu Gln Ile Lys Ala  
 465 470 475 480  
 Ala Gln Lys His Leu Glu Glu Val Lys Thr Ser His Asn Gly Leu Asp  
 485 490 495  
 Ser Leu Ser Ser His Glu Gln Asp Tyr Pro Ser Asn Ala Lys Glu Met  
 500 505 510  
 Lys Asp Leu Asp Lys Lys Ile Glu Glu Lys Ile Ala Gly Ile Met Lys  
 515 520 525  
 Gln Tyr Gly Val Lys Arg Glu Ser Ile Val Val Asn Lys Glu Lys Asn  
 530 535 540  
 Ala Ile Ile Tyr Pro His Gly Asp His His His Ala Asp Pro Ile Asp  
 545 550 555 560  
 Glu His Lys Pro Val Gly Ile Gly His Ser His Ser Asn Tyr Glu Leu  
 565 570 575  
 Phe Lys Pro Glu Glu Gly Val Ala Lys Lys Glu Gly Asn Lys Val Tyr  
 580 585 590  
 Thr Gly Glu Glu Leu Thr Asn Val Val Asn Leu Leu Lys Asn Ser Thr  
 595 600 605  
 Phe Asn Asn Gln Asn Phe Thr Leu Ala Asn Gly Gln Lys Arg Val Ser  
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Phe Ser Phe Pro Pro Glu Leu Glu Lys Lys Leu Gly Ile Asn Met Leu  
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 Val Lys Leu Ile Thr Pro Asp Gly Lys Val Leu Glu Lys Val Ser Gly  
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 Lys Val Phe Gly Glu Gly Val Gly Asn Ile Ala Asn Phe Glu Leu Asp  
 660 665 670  
 Gln Pro Tyr Leu Pro Gly Gln Thr Phe Lys Tyr Thr Ile Ala Ser Lys  
 675 680 685  
 Asp Tyr Pro Glu Val Ser Tyr Asp Gly Thr Phe Thr Val Pro Thr Ser  
 690 695 700  
 Leu Ala Tyr Lys Met Ala Ser Gln Thr Ile Phe Tyr Pro Phe His Ala  
 705 710 715 720  
 Gly Asp Thr Tyr Leu Arg Val Asn Pro Gln Phe Ala Val Pro Lys Gly  
 725 730 735  
 Thr Asp Ala Leu Val Arg Val Phe Asp Glu Phe His Gly Asn Ala Tyr  
 740 745 750  
 Leu Glu Asn Asn Tyr Lys Val Gly Glu Ile Lys Leu Pro Ile Pro Lys  
 755 760 765  
 Leu Asn Gln Gly Thr Thr Arg Thr Ala Gly Asn Lys Ile Pro Val Thr  
 770 775 780  
 Phe Met Ala Asn Ala Tyr Leu Asp Asn Gln Ser Thr Tyr Ile Val Glu  
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 Val Pro Ile Leu Glu Lys Glu Asn Gln Thr Asp Lys Pro Ser Ile Leu  
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 Pro Gln Phe Lys Arg Asn Lys Ala Gln Glu Asn Leu Lys Leu Asp Glu  
 820 825 830  
 Lys Val Glu Glu Pro Lys Thr Ser Glu Lys Val Glu Lys Glu Lys Leu  
 835 840 845  
 Ser Glu Thr Gly Asn Ser Thr Ser Asn Ser Thr Leu Glu Glu Val Pro  
 850 855 860  
 Thr Val Asp Pro Val Gln Glu Lys Val Ala Lys Phe Ala Glu Ser Tyr

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|            |             |            |            |            |            |             |             |            |            |            |             |             |            |            |            |     |  |  |  |
|------------|-------------|------------|------------|------------|------------|-------------|-------------|------------|------------|------------|-------------|-------------|------------|------------|------------|-----|--|--|--|
|            |             |            |            | 865        |            |             |             | 870        |            |            |             | 875         |            |            |            | 880 |  |  |  |
| Gly        | Met         | Lys        | Leu        | Glu<br>885 | Asn        | Val         | Leu         | Phe        | Asn<br>890 | Met        | Asp         | Gly         | Thr        | Ile<br>895 | Glu        |     |  |  |  |
| Leu        | Tyr         | Leu        | Pro<br>900 | Ser        | Gly        | Glu         | Val         | Ile<br>905 | Lys        | Lys        | Asn         | Met         | Ala<br>910 | Asp        | Phe        |     |  |  |  |
| Thr        | Gly         | Glu<br>915 | Ala        | Pro        | Gln        | Gly         | Asn<br>920  | Gly        | Glu        | Asn        | Lys         | Pro<br>925  | Ser        | Glu        | Asn        |     |  |  |  |
| Gly        | Lys<br>930  | Val        | Ser        | Thr        | Gly        | Thr<br>935  | Val         | Glu        | Asn        | Gln        | Pro<br>940  | Thr         | Glu        | Asn        | Lys        |     |  |  |  |
| Pro<br>945 | Ala         | Asp        | Ser        | Leu        | Pro<br>950 | Glu         | Ala         | Pro        | Asn        | Glu<br>955 | Lys         | Pro         | Val        | Lys        | Pro<br>960 |     |  |  |  |
| Glu        | Asn         | Ser        | Thr        | Asp<br>965 | Asn        | Gly         | Met         | Leu        | Asn<br>970 | Pro        | Glu         | Gly         | Asn        | Val<br>975 | Gly        |     |  |  |  |
| Ser        | Asp         | Pro        | Met<br>980 | Leu        | Asp        | Pro         | Ala         | Leu<br>985 | Glu        | Glu        | Ala         | Pro         | Ala<br>990 | Val        | Asp        |     |  |  |  |
| Pro        | Val         | Gln<br>995 | Glu        | Lys        | Leu        | Glu         | Lys<br>1000 | Phe        | Thr        | Ala        | Ser         | Tyr<br>1005 | Gly        | Leu        | Gly        |     |  |  |  |
| Leu        | Asp<br>1010 | Ser        | Val        | Ile        | Phe        | Asn<br>1015 | Met         | Asp        | Gly        | Thr        | Ile<br>1020 | Glu         | Leu        | Arg        |            |     |  |  |  |
| Leu        | Pro<br>1025 | Ser        | Gly        | Glu        | Val        | Ile<br>1030 | Lys         | Lys        | Asn        | Leu        | Ser<br>1035 | Asp         | Leu        | Ile        |            |     |  |  |  |

Ala

|       |                          |
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| <211> | 477                      |
| <212> | PRT                      |
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Ala Gly His Glu Val Ala Val Ile Leu Pro Tyr Tyr Asp Met Val Glu  
Page 240

35

40

45

Ala Lys Phe Gly Asn Gln Ile Glu Asp Val Leu His Phe Glu Val Ser  
 50 55 60  
 Val Gly Trp Arg Arg Gln Tyr Cys Gly Ile Lys Lys Thr Val Leu Asn  
 65 70 75 80  
 Gly Val Thr Phe Tyr Phe Ile Asp Asn Gln Tyr Tyr Phe Phe Arg Gly  
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 His Val Tyr Gly Asp Phe Asp Asp Gly Glu Arg Phe Ala Phe Phe Gln  
 100 105 110  
 Leu Ala Ala Ile Glu Ala Met Glu Arg Ile Asp Phe Ile Pro Asp Leu  
 115 120 125  
 Leu His Val His Asp Tyr His Thr Ala Met Ile Pro Phe Leu Leu Lys  
 130 135 140  
 Glu Lys Tyr Arg Trp Ile Gln Ala Tyr Glu Asp Ile Glu Thr Val Leu  
 145 150 155 160  
 Thr Ile His Asn Leu Glu Phe Gln Gly Gln Phe Ser Glu Gly Met Leu  
 165 170 175  
 Gly Asp Leu Phe Gly Val Gly Phe Glu Arg Tyr Ala Asp Gly Thr Leu  
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 Arg Trp Asn Asn Cys Leu Asn Trp Met Lys Ala Gly Ile Leu Tyr Ala  
 195 200 205  
 Asn Arg Val Ser Thr Val Ser Pro Ser Tyr Ala His Glu Ile Met Thr  
 210 215 220  
 Ser Gln Phe Gly Cys Asn Leu Asp Gln Ile Leu Lys Met Glu Ser Gly  
 225 230 235 240  
 Lys Val Ser Gly Ile Val Asn Gly Ile Asp Ala Asp Leu Tyr Asn Pro  
 245 250 255  
 Gln Thr Asp Ala Leu Leu Asp Tyr His Phe Asn Gln Glu Asp Leu Ser  
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 Gly Lys Ala Lys Asn Lys Ala Lys Leu Gln Glu Arg Val Gly Leu Pro  
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Gln Lys Gly Phe Asp Val Val Val Glu Ser Leu His His Ile Leu Gln  
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Glu Asp Val Gln Ile Val Leu Leu Gly Thr Gly Asp Pro Ala Phe Glu  
 325 330 335

Gly Ala Phe Ser Trp Phe Ala Gln Ile Tyr Pro Asp Lys Leu Ser Thr  
 340 345 350

Asn Ile Thr Phe Asp Val Lys Leu Ala Gln Glu Ile Tyr Ala Ala Cys  
 355 360 365

Asp Leu Phe Leu Met Pro Ser Arg Phe Glu Pro Cys Gly Leu Ser Gln  
 370 375 380

Met Met Ala Met Arg Tyr Gly Thr Leu Pro Leu Val His Glu Val Gly  
 385 390 395 400

Gly Leu Arg Asp Thr Val Arg Ala Phe Asn Pro Ile Glu Gly Ser Gly  
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Thr Gly Phe Ser Phe Asp Asn Leu Ser Pro Tyr Trp Leu Asn Trp Thr  
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Phe Gln Thr Ala Leu Asp Leu Tyr Arg Asn His Pro Asp Ile Trp Arg  
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 Tyr Tyr Leu Val Tyr Lys Leu Asn Ser Gln Asn Gln Leu Ala Glu Leu  
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 Pro Asn Thr Gly Ser Lys Asn Glu Arg Gln Ala Leu Val Ala Gly Ala  
 100 105 110  
 Ser Leu Ala Ala Met Gly Ile Leu Ile Phe Ala Val Ser Lys Lys Lys  
 115 120 125  
 Val Lys Asn Lys Thr Val Leu His Leu Val Leu Val Ala Gly Ile Gly  
 130 135 140  
 Asn Gly Val Leu Val Ser Val His Ala Leu Glu Asn His Leu Leu Leu  
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 Pro Lys Glu Ile Ser Gly Tyr Thr Tyr Ile Gly Tyr Ile Lys Glu Gly  
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 Thr Pro Thr Lys Gln Gln Lys Val Asp Tyr Asn Val Thr Pro Asn Phe  
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 Val Asp His Pro Ser Thr Val Gln Ala Ile Gln Glu Gln Thr Pro Val  
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## 1028462\_1.TXT

Lys Ile Ser Pro Lys Glu Lys Thr Gly Val Asn Thr Leu Asn Pro Gln  
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 Leu Gly Lys Lys Val Glu Ile Val Arg Ile Phe Ser Val Asn Lys Glu  
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 Glu Val Ser Arg Glu Ile Val Ser Thr Ser Thr Thr Ala Pro Ser Pro  
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 Arg Ile Val Glu Lys Gly Thr Lys Lys Thr Gln Val Ile Lys Glu Gln  
 385 390 395 400  
 Pro Glu Thr Gly Val Glu His Lys Asp Val Gln Ser Gly Ala Ile Val  
 405 410 415  
 Glu Pro Ala Ile Gln Pro Glu Leu Pro Glu Ala Val Val Ser Asp Lys  
 420 425 430  
 Gly Glu Pro Glu Val Gln Pro Thr Leu Pro Glu Ala Val Val Thr Asp  
 435 440 445  
 Lys Gly Glu Thr Glu Val Gln Pro Glu Ser Pro Asp Thr Val Val Ser  
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 Asp Lys Gly Glu Pro Glu Gln Val Ala Pro Leu Pro Glu Tyr Lys Gly  
 465 470 475 480  
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 485 490 495  
 Gln Gly Pro Glu Lys Thr Glu Glu Val Pro Val Lys Pro Thr Glu Glu  
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 580 585 590  
 Val Pro Val Asn Pro Asn Glu Gly Thr Val Glu Gly Thr Ser Asn Gln  
 595 600 605  
 Glu Thr Glu Lys Pro Val Gln Pro Ala Glu Glu Thr Gln Thr Asn Ser  
 610 615 620  
 Gly Lys Ile Ala Asn Glu Asn Thr Gly Glu Val Ser Asn Lys Pro Ser  
 625 630 635 640  
 Asp Ser Lys Pro Pro Val Glu Glu Ser Asn Gln Pro Glu Lys Asn Gly  
 645 650 655  
 Thr Ala Thr Lys Pro Glu Asn Ser Gly Asn Thr Thr Ser Glu Asn Gly  
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 Gln Thr Glu Pro Glu Pro Ser Asn Gly Asn Ser Thr Glu Asp Val Ser  
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 Thr Glu Ser Asn Thr Ser Asn Ser Asn Gly Asn Glu Glu Ile Lys Gln  
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 Glu Asn Glu Leu Asp Pro Asp Lys Lys Val Glu Glu Pro Glu Lys Thr  
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 Leu Glu Leu Arg Asn Val Ser Asp Leu Glu Leu Tyr Ser Leu Ser Asn  
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 Gly Thr Tyr Lys Gln His Ile Ser Leu Glu Gln Val Pro Ser Asn Pro  
 740 745 750  
 Asn Ser Tyr Phe Val Lys Val Lys Ser Ser Ser Phe Lys Asp Val Tyr  
 755 760 765  
 Leu Pro Val Ala Ser Ile Ser Glu Glu Arg Lys Asn Asp Lys Ile Leu  
 770 775 780  
 Tyr Lys Ile Thr Ala Lys Val Glu Lys Leu Gln Gln Glu Ile Glu Ser

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Arg Tyr Lys Asp Asn Phe Thr Phe Tyr Leu Ala Lys Lys Gly Thr Glu
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Glu Thr Thr Asn Phe Thr Ser Phe Ser Asn Leu Val Lys Ala Ile Asn
      820      825      830
Gln Asn Pro Ser Gly Thr Tyr His Leu Ala Ala Ser Leu Asn Ala Asn
      835      840      845
Glu Val Glu Leu Gly Pro Asp Glu Arg Ser Tyr Ile Lys Asp Thr Phe
      850      855      860
Thr Gly Arg Leu Ile Gly Glu Lys Asp Gly Lys Asn Tyr Ala Ile Tyr
865      870      875      880
Asn Leu Lys Lys Pro Leu Phe Glu Asn Leu Ser Gly Ala Thr Val Glu
      885      890      895
Lys Leu Ser Leu Lys Asn Val Ala Ile Ser Gly Lys Asp Asp Ile Gly
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Val Asp Gly Val Leu Ala Gly Glu Arg Gly Ile Gly Gly Leu Leu Ala
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Lys Ala Glu Gln Ser Ser Ile Thr Glu Ser Ser Phe Lys Gly Arg Ile
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Ile Asn Thr Tyr Glu Thr Thr Ala Ala Tyr Asn Ile Gly Gly Met Val
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      980      985      990
Val Ala Ile Ser Ser Asn Thr Asn Thr Ser Asp Gln Thr Val Gly Gly
      995      1000      1005
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| Gly | Val  | Ala | Gly | Asn | Leu | Trp  | Asp | Arg | Thr | Ser | Gly  | Asp | Val | Arg |
|     | 1040 |     |     |     |     | 1045 |     |     |     |     | 1050 |     |     |     |
| His | Ala  | Gly | Ser | Leu | Thr | Asn  | Val | Leu | Ser | Asp | Val  | Asn | Val | Thr |
|     | 1055 |     |     |     |     | 1060 |     |     |     |     | 1065 |     |     |     |
| Asn | Gly  | Asn | Ala | Ile | Thr | Gly  | Tyr | His | Tyr | Asn | Glu  | Met | Lys | Val |
|     | 1070 |     |     |     |     | 1075 |     |     |     |     | 1080 |     |     |     |
| Lys | Asp  | Thr | Phe | Ser | Ser | Lys  | Ala | Asn | Arg | Val | Tyr  | Asn | Val | Thr |
|     | 1085 |     |     |     |     | 1090 |     |     |     |     | 1095 |     |     |     |
| Leu | Val  | Lys | Asp | Glu | Val | Val  | Ser | Lys | Glu | Ser | Phe  | Glu | Glu | Arg |
|     | 1100 |     |     |     |     | 1105 |     |     |     |     | 1110 |     |     |     |
| Gly | Thr  | Met | Leu | Asp | Ala | Ser  | Gln | Ile | Ala | Ser | Lys  | Lys | Ala | Glu |
|     | 1115 |     |     |     |     | 1120 |     |     |     |     | 1125 |     |     |     |
| Ile | Asn  | Pro | Leu | Ile | Leu | Pro  | Thr | Val | Glu | Pro | Leu  | Ser | Thr | Ser |
|     | 1130 |     |     |     |     | 1135 |     |     |     |     | 1140 |     |     |     |
| Gly | Lys  | Lys | Asp | Ser | Asp | Phe  | Ser | Lys | Val | Ala | Tyr  | Tyr | Gln | Ala |
|     | 1145 |     |     |     |     | 1150 |     |     |     |     | 1155 |     |     |     |
| Lys | Arg  | Asn | Leu | Thr | Tyr | Lys  | Asn | Ile | Glu | Lys | Leu  | Leu | Pro | Phe |
|     | 1160 |     |     |     |     | 1165 |     |     |     |     | 1170 |     |     |     |
| Tyr | Asn  | Lys | Ala | Thr | Ile | Val  | Lys | Tyr | Gly | Asn | Leu  | Val | Asn | Glu |
|     | 1175 |     |     |     |     | 1180 |     |     |     |     | 1185 |     |     |     |
| Asn | Ser  | Leu | Leu | Tyr | Gln | Lys  | Glu | Leu | Leu | Ser | Ala  | Val | Met | Met |
|     | 1190 |     |     |     |     | 1195 |     |     |     |     | 1200 |     |     |     |
| Lys | Asp  | Asn | Gln | Val | Ile | Thr  | Asp | Ile | Val | Ser | Asn  | Lys | Gln | Thr |
|     | 1205 |     |     |     |     | 1210 |     |     |     |     | 1215 |     |     |     |
| Ala | Asn  | Lys | Leu | Leu | Leu | His  | Tyr | Lys | Asp | Asp | Leu  | Ser | Glu | Lys |
|     | 1220 |     |     |     |     | 1225 |     |     |     |     | 1230 |     |     |     |
| Leu | Asp  | Leu | Lys | Tyr | Gln | Asn  | Asp | Phe | Ala | Lys | Leu  | Ala | Glu | Tyr |
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| Ser | Leu  | Gly | Asn | Thr | Gly | Leu  | Leu | Tyr | Thr | Pro | Asn  | Gln | Phe | Leu |
|     | 1250 |     |     |     |     | 1255 |     |     |     |     | 1260 |     |     |     |
| Tyr | Asp  | Gln | Thr | Ser | Ile | Ile  | Lys | Gln | Val | Leu | Pro  | Asp | Leu | Gln |
|     | 1265 |     |     |     |     | 1270 |     |     |     |     | 1275 |     |     |     |

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 Ala Lys Thr Lys Gln Gln Leu Glu Asp Ser Leu Lys Lys Leu Leu  
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 Ser Ala Asp Ala Gly Leu Ala Ser Ala Asn Pro Val Thr Glu Gly  
 1325 1330 1335  
 Tyr Leu Val Asp Lys Ile Lys Arg Asn Lys Glu Ala Leu Leu Leu  
 1340 1345 1350  
 Gly Leu Thr Tyr Leu Glu Arg Trp Tyr Asn Phe Ser Tyr Gly Gln  
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 Val Asn Val Lys Asp Leu Val Leu Tyr His Leu Asp Phe Phe Gly  
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 Lys Gly Asn Ala Ser Pro Leu Asp Thr Leu Ile Glu Leu Gly Lys  
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 Gly Ile Ser Leu Ala Ser Gln His Gly Thr Thr Asp Leu Phe Ser  
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 1460 1465 1470  
 Thr Lys Tyr Ser Ile Gly Val Tyr Asp Arg Ile Thr Ser Ala Thr  
 1475 1480 1485  
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| Ala  | Tyr | Asp | Arg | Tyr | Arg | Ser  | Ser | Asp | His | Lys | Ala  | Gly | Lys | Ala |
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| Leu  | Asn | Asp | Phe | Val | Glu | Glu  | Asn | Ala | Arg | Glu | Thr  | Ala | Lys | Arg |
| 1535 |     |     |     |     |     | 1540 |     |     |     |     | 1545 |     |     |     |
| Gln  | Arg | Asp | His | Tyr | Asp | Tyr  | Trp | Tyr | Arg | Ile | Leu  | Asp | Asp | Asn |
| 1550 |     |     |     |     |     | 1555 |     |     |     |     | 1560 |     |     |     |
| Ala  | Arg | Glu | Lys | Leu | Tyr | Arg  | Asn | Ile | Leu | Leu | Tyr  | Asp | Ala | Tyr |
| 1565 |     |     |     |     |     | 1570 |     |     |     |     | 1575 |     |     |     |
| Lys  | Phe | Gly | Asp | Asp | Asn | Thr  | Val | Gly | Lys | Ala | Thr  | Glu | Val | Ala |
| 1580 |     |     |     |     |     | 1585 |     |     |     |     | 1590 |     |     |     |
| Asp  | Phe | Asp | Asn | Pro | Asn | Pro  | Ala | Met | Gln | His | Phe  | Phe | Gly | Pro |
| 1595 |     |     |     |     |     | 1600 |     |     |     |     | 1605 |     |     |     |
| Val  | Gly | Asn | Lys | Val | Gly | His  | Asn | Gln | His | Gly | Ala  | Tyr | Ala | Thr |
| 1610 |     |     |     |     |     | 1615 |     |     |     |     | 1620 |     |     |     |
| Gly  | Asp | Ala | Val | Tyr | Tyr | Met  | Gly | Tyr | Arg | Met | Leu  | Asp | Lys | Asp |
| 1625 |     |     |     |     |     | 1630 |     |     |     |     | 1635 |     |     |     |
| Gly  | Ala | Ile | Thr | Tyr | Thr | His  | Glu | Met | Thr | His | Asp  | Ser | Asp | Gln |
| 1640 |     |     |     |     |     | 1645 |     |     |     |     | 1650 |     |     |     |
| Asp  | Ile | Tyr | Leu | Gly | Gly | Tyr  | Gly | Arg | Arg | Ser | Gly  | Leu | Gly | Pro |
| 1655 |     |     |     |     |     | 1660 |     |     |     |     | 1665 |     |     |     |
| Glu  | Phe | Phe | Ala | Lys | Gly | Leu  | Leu | Gln | Ala | Pro | Asp  | His | Pro | Asp |
| 1670 |     |     |     |     |     | 1675 |     |     |     |     | 1680 |     |     |     |
| Asp  | Ala | Thr | Ile | Thr | Ile | Asn  | Ser | Ile | Leu | Lys | His  | Ser | Lys | Ser |
| 1685 |     |     |     |     |     | 1690 |     |     |     |     | 1695 |     |     |     |
| Asp  | Ser | Thr | Glu | Ser | Arg | Arg  | Leu | Gln | Val | Leu | Asp  | Pro | Thr | Thr |
| 1700 |     |     |     |     |     | 1705 |     |     |     |     | 1710 |     |     |     |
| Arg  | Phe | Asn | Asn | Ala | Asp | Asp  | Leu | Lys | Gln | Tyr | Val  | His | Asn | Met |
| 1715 |     |     |     |     |     | 1720 |     |     |     |     | 1725 |     |     |     |
| Phe  | Asp | Val | Val | Tyr | Met | Leu  | Glu | Tyr | Leu | Glu | Gly  | Asn | Ser | Ile |
| 1730 |     |     |     |     |     | 1735 |     |     |     |     | 1740 |     |     |     |
| Leu  | Lys | Leu | Asp | Thr | Asn | Gln  | Lys | Gln | Gln | Leu | Leu  | Arg | Lys | Val |

|      |      |     |     |     |     |      |     |     |     |     |      |      |     |     |  |
|------|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|------|-----|-----|--|
| 1745 |      |     |     |     |     | 1750 |     |     |     |     |      | 1755 |     |     |  |
| Thr  | Asn  | Glu | Tyr | His | Pro | Asp  | Pro | Asp | Gly | Asn | Lys  | Val  | Tyr | Ala |  |
|      | 1760 |     |     |     |     | 1765 |     |     |     |     | 1770 |      |     |     |  |
| Thr  | Asn  | Val | Val | Arg | Asn | Leu  | Thr | Val | Glu | Glu | Val  | Glu  | Arg | Leu |  |
|      | 1775 |     |     |     |     | 1780 |     |     |     |     | 1785 |      |     |     |  |
| Arg  | Ser  | Phe | Asn | Asp | Leu | Ile  | Asp | Asn | Asn | Ile | Leu  | Ser  | Ser | Arg |  |
|      | 1790 |     |     |     |     | 1795 |     |     |     |     | 1800 |      |     |     |  |
| Glu  | Tyr  | Ala | Ser | Gly | Lys | Tyr  | Glu | Arg | Asn | Gly | Tyr  | Phe  | Thr | Ile |  |
|      | 1805 |     |     |     |     | 1810 |     |     |     |     | 1815 |      |     |     |  |
| Lys  | Leu  | Phe | Ala | Pro | Ile | Tyr  | Ala | Ala | Leu | Ser | Asn  | Asp  | Ile | Gly |  |
|      | 1820 |     |     |     |     | 1825 |     |     |     |     | 1830 |      |     |     |  |
| Thr  | Pro  | Gly | Asp | Leu | Met | Gly  | Arg | Arg | Ile | Ala | Tyr  | Glu  | Leu | Leu |  |
|      | 1835 |     |     |     |     | 1840 |     |     |     |     | 1845 |      |     |     |  |
| Ala  | Ala  | Lys | Gly | Phe | Lys | Asp  | Gly | Met | Val | Pro | Tyr  | Ile  | Ser | Asn |  |
|      | 1850 |     |     |     |     | 1855 |     |     |     |     | 1860 |      |     |     |  |
| Gln  | Tyr  | Glu | Glu | Glu | Ala | Lys  | Gln | Lys | Gly | Lys | Thr  | Ile  | Asn | Leu |  |
|      | 1865 |     |     |     |     | 1870 |     |     |     |     | 1875 |      |     |     |  |
| Tyr  | Gly  | Lys | Thr | Arg | Gly | Leu  | Val | Thr | Asp | Asp | Leu  | Val  | Leu | Glu |  |
|      | 1880 |     |     |     |     | 1885 |     |     |     |     | 1890 |      |     |     |  |
| Lys  | Val  | Phe | Asn | Asn | Gln | Tyr  | His | Thr | Trp | Ser | Glu  | Phe  | Lys | Lys |  |
|      | 1895 |     |     |     |     | 1900 |     |     |     |     | 1905 |      |     |     |  |
| Ala  | Met  | Tyr | Gln | Glu | Arg | Gln  | Asp | Gln | Phe | Asp | Arg  | Leu  | Asn | Lys |  |
|      | 1910 |     |     |     |     | 1915 |     |     |     |     | 1920 |      |     |     |  |
| Val  | Thr  | Phe | Asn | Asp | Thr | Thr  | Gln | Pro | Trp | Gln | Thr  | Phe  | Ala | Lys |  |
|      | 1925 |     |     |     |     | 1930 |     |     |     |     | 1935 |      |     |     |  |
| Lys  | Thr  | Thr | Ser | Ser | Val | Asp  | Glu | Leu | Gln | Lys | Leu  | Met  | Asp | Val |  |
|      | 1940 |     |     |     |     | 1945 |     |     |     |     | 1950 |      |     |     |  |
| Ala  | Val  | Arg | Lys | Asp | Ala | Glu  | His | Asn | Tyr | Tyr | His  | Trp  | Asn | Asn |  |
|      | 1955 |     |     |     |     | 1960 |     |     |     |     | 1965 |      |     |     |  |
| Tyr  | Asn  | Pro | Asp | Ile | Asp | Ser  | Glu | Val | His | Lys | Leu  | Lys  | Arg | Ala |  |
|      | 1970 |     |     |     |     | 1975 |     |     |     |     | 1980 |      |     |     |  |

Ile Phe Lys Ala Tyr Leu Asp Gln Thr Asn Asp Phe Arg Ser Ser  
 1985 1990 1995

Ile Phe Glu Asn Lys Lys  
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<210> 193  
 <211> 819  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 193

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Leu Ser Val Cys Ser Tyr Glu Leu Gly Arg Tyr Gln Ala Gly Gln Asp  
 20 25 30

Lys Lys Glu Ser Asn Arg Val Ala Tyr Ile Asp Gly Asp Gln Ala Gly  
 35 40 45

Gln Lys Ala Glu Asn Leu Thr Pro Asp Glu Val Ser Lys Arg Glu Gly  
 50 55 60

Ile Asn Ala Glu Gln Ile Val Ile Lys Ile Thr Asp Gln Gly Tyr Val  
 65 70 75 80

Thr Ser His Gly Asp His Tyr His Tyr Tyr Asn Gly Lys Val Pro Tyr  
 85 90 95

Asp Ala Ile Ile Ser Glu Glu Leu Leu Met Lys Asp Pro Asn Tyr Gln  
 100 105 110

Leu Lys Asp Ser Asp Ile Val Asn Glu Ile Lys Gly Gly Tyr Val Ile  
 115 120 125

Lys Val Asn Gly Lys Tyr Tyr Val Tyr Leu Lys Asp Ala Ala His Ala  
 130 135 140

Asp Asn Ile Arg Thr Lys Glu Glu Ile Lys Arg Gln Lys Gln Glu Arg  
 145 150 155 160

Ser His Asn His Asn Ser Arg Ala Asp Asn Ala Val Ala Ala Ala Arg  
 165 170 175

Ala Gln Gly Arg Tyr Thr Thr Asp Asp Gly Tyr Ile Phe Asn Ala Ser  
 180 185 190

Asp Ile Ile Glu Asp Thr Gly Asp Ala Tyr Ile Val Pro His Gly Asp  
 195 200 205  
 His Tyr His Tyr Ile Pro Lys Asn Glu Leu Ser Ala Ser Glu Leu Ala  
 210 215 220  
 Ala Ala Glu Ala Tyr Trp Asn Gly Lys Gln Gly Ser Arg Pro Ser Ser  
 225 230 235 240  
 Ser Ser Ser Tyr Asn Ala Asn Pro Ala Gln Pro Arg Leu Ser Glu Asn  
 245 250 255  
 His Asn Leu Thr Val Thr Pro Thr Tyr His Gln Asn Gln Gly Glu Asn  
 260 265 270  
 Ile Ser Ser Leu Leu Arg Glu Leu Tyr Ala Lys Pro Leu Ser Glu Arg  
 275 280 285  
 His Val Glu Ser Asp Gly Leu Ile Phe Asp Pro Ala Gln Ile Thr Ser  
 290 295 300  
 Arg Thr Ala Arg Gly Val Ala Val Pro His Gly Asn His Tyr His Phe  
 305 310 315 320  
 Ile Pro Tyr Glu Gln Met Ser Glu Leu Glu Lys Arg Ile Ala Arg Ile  
 325 330 335  
 Ile Pro Leu Arg Tyr Arg Ser Asn His Trp Val Pro Asp Ser Arg Pro  
 340 345 350  
 Glu Glu Pro Ser Pro Gln Pro Thr Pro Glu Pro Ser Pro Ser Pro Gln  
 355 360 365  
 Pro Ala Pro Ser Asn Pro Ile Asp Glu Lys Leu Val Lys Glu Ala Val  
 370 375 380  
 Arg Lys Val Gly Asp Gly Tyr Val Phe Glu Glu Asn Gly Val Ser Arg  
 385 390 395 400  
 Tyr Ile Pro Ala Lys Asp Leu Ser Ala Glu Thr Ala Ala Gly Ile Asp  
 405 410 415  
 Ser Lys Leu Ala Lys Gln Glu Ser Leu Ser His Lys Leu Gly Thr Lys  
 420 425 430  
 Lys Thr Asp Leu Pro Ser Ser Asp Arg Glu Phe Tyr Asn Lys Ala Tyr  
 435 440 445



## 1028462\_1.TXT

Asp Leu Leu Ala Arg Ile His Gln Asp Leu Leu Asp Asn Lys Gly Arg  
 450 455 460  
 Gln Val Asp Phe Glu Ala Leu Asp Asn Leu Leu Glu Arg Leu Lys Asp  
 465 470 475 480  
 Val Ser Ser Asp Lys Val Lys Leu Val Glu Asp Ile Leu Ala Phe Leu  
 485 490 495  
 Ala Pro Ile Arg His Pro Glu Arg Leu Gly Lys Pro Asn Ala Gln Ile  
 500 505 510  
 Thr Tyr Thr Asp Asp Glu Ile Gln Val Ala Lys Leu Ala Gly Lys Tyr  
 515 520 525  
 Thr Thr Glu Asp Gly Tyr Ile Phe Asp Pro Arg Asp Ile Thr Ser Asp  
 530 535 540  
 Glu Gly Asp Ala Tyr Val Thr Pro His Met Thr His Ser His Trp Ile  
 545 550 555 560  
 Lys Lys Asp Ser Leu Ser Glu Ala Glu Arg Ala Ala Ala Gln Ala Tyr  
 565 570 575  
 Ala Lys Glu Lys Gly Leu Thr Pro Pro Ser Thr Asp His Gln Asp Ser  
 580 585 590  
 Gly Asn Thr Glu Ala Lys Gly Ala Glu Ala Ile Tyr Asn Arg Val Lys  
 595 600 605  
 Ala Ala Lys Lys Val Pro Leu Asp Arg Met Pro Tyr Asn Leu Gln Tyr  
 610 615 620  
 Thr Val Glu Val Lys Asn Gly Ser Leu Ile Ile Pro His Tyr Asp His  
 625 630 635 640  
 Tyr His Asn Ile Lys Phe Glu Trp Phe Asp Glu Gly Leu Tyr Glu Ala  
 645 650 655  
 Pro Lys Gly Tyr Thr Leu Glu Asp Leu Leu Ala Thr Val Lys Tyr Tyr  
 660 665 670  
 Val Glu His Pro Asn Glu Arg Pro His Ser Asp Asn Gly Phe Gly Asn  
 675 680 685  
 Ala Ser Asp His Val Gln Arg Asn Lys Asn Gly Gln Ala Asp Thr Asn  
 690 695 700

1028462\_1.TXT

Gln Thr Glu Lys Pro Ser Glu Glu Lys Pro Gln Thr Glu Lys Pro Glu  
705 710 715 720

Glu Glu Thr Pro Arg Glu Glu Lys Pro Gln Ser Glu Lys Pro Glu Ser  
725 730 735

Pro Lys Pro Thr Glu Glu Pro Glu Glu Ser Pro Glu Glu Ser Glu Glu  
740 745 750

Pro Gln Val Glu Thr Glu Lys Val Glu Glu Lys Leu Arg Glu Ala Glu  
755 760 765

Asp Leu Leu Gly Lys Ile Gln Asp Pro Ile Ile Lys Ser Asn Ala Lys  
770 775 780

Glu Thr Leu Thr Gly Leu Lys Asn Asn Leu Leu Phe Gly Thr Gln Asp  
785 790 795 800

Asn Asn Thr Ile Met Ala Glu Ala Glu Lys Leu Leu Ala Leu Leu Lys  
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Glu Ser Lys

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<211> 802  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 194

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Thr Val Lys Glu Asn Asn Arg Val Ser Tyr Ile Asp Gly Lys Gln Ala  
20 25 30

Thr Gln Lys Thr Glu Asn Leu Thr Pro Asp Glu Val Ser Lys Arg Glu  
35 40 45

Gly Ile Asn Ala Glu Gln Ile Val Ile Lys Ile Thr Asp Gln Gly Tyr  
50 55 60

Val Thr Ser His Gly Asp His Tyr His Tyr Tyr Asn Gly Lys Val Pro  
65 70 75 80

Tyr Asp Ala Ile Ile Ser Glu Glu Leu Leu Met Lys Asp Pro Asn Tyr  
85 90 95

1028462\_1.TXT

Lys Leu Lys Asp Glu Asp Ile Val Asn Glu Val Lys Gly Gly Tyr Val  
 100 105 110  
 Ile Lys Val Asp Gly Lys Tyr Tyr Val Tyr Leu Lys Asp Ala Ala His  
 115 120 125  
 Ala Asp Asn Val Arg Thr Lys Glu Glu Ile Asn Arg Gln Lys Gln Glu  
 130 135 140  
 His Ser Gln His Arg Glu Gly Gly Thr Pro Arg Asn Asp Gly Ala Val  
 145 150 155 160  
 Ala Leu Ala Arg Ser Gln Gly Arg Tyr Thr Thr Asp Asp Gly Tyr Ile  
 165 170 175  
 Phe Asn Ala Ser Asp Ile Ile Glu Asp Thr Gly Asp Ala Tyr Ile Val  
 180 185 190  
 Pro His Gly Asp His Tyr His Tyr Ile Pro Lys Asn Glu Leu Ser Ala  
 195 200 205  
 Ser Glu Leu Ala Ala Ala Glu Ala Phe Leu Ser Gly Arg Gly Asn Leu  
 210 215 220  
 Ser Asn Ser Arg Thr Tyr Arg Arg Gln Asn Ser Asp Asn Thr Ser Arg  
 225 230 235 240  
 Thr Asn Trp Val Pro Ser Val Ser Asn Pro Gly Thr Thr Asn Thr Asn  
 245 250 255  
 Thr Ser Asn Asn Ser Asn Thr Asn Ser Gln Ala Ser Gln Ser Asn Asp  
 260 265 270  
 Ile Asp Ser Leu Leu Lys Gln Leu Tyr Lys Leu Pro Leu Ser Gln Arg  
 275 280 285  
 His Val Glu Ser Asp Gly Leu Val Phe Asp Pro Ala Gln Ile Thr Ser  
 290 295 300  
 Arg Thr Ala Arg Gly Val Ala Val Pro His Gly Asp His Tyr His Phe  
 305 310 315 320  
 Ile Pro Tyr Ser Gln Met Ser Glu Leu Glu Glu Arg Ile Ala Arg Ile  
 325 330 335  
 Ile Pro Leu Arg Tyr Arg Ser Asn His Trp Val Pro Asp Ser Arg Pro  
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340                               345                               350
Glu Gln Pro Ser Pro Gln Pro Thr Pro Glu Pro Ser Pro Gly Pro Gln
355                               360                               365
Pro Ala Pro Asn Leu Lys Ile Asp Ser Asn Ser Ser Leu Val Ser Gln
370                               375                               380
Leu Val Arg Lys Val Gly Glu Gly Tyr Val Phe Glu Glu Lys Gly Ile
385                               390                               395
Ser Arg Tyr Val Phe Ala Lys Asp Leu Pro Ser Glu Thr Val Lys Asn
405                               410                               415
Leu Glu Ser Lys Leu Ser Lys Gln Glu Ser Val Ser His Thr Leu Thr
420                               425                               430
Ala Lys Lys Glu Asn Val Ala Pro Arg Asp Gln Glu Phe Tyr Asp Lys
435                               440                               445
Ala Tyr Asn Leu Leu Thr Glu Ala His Lys Ala Leu Phe Glu Asn Lys
450                               455                               460
Gly Arg Asn Ser Asp Phe Gln Ala Leu Asp Lys Leu Leu Glu Arg Leu
465                               470                               475
Asn Asp Glu Ser Thr Asn Lys Glu Lys Leu Val Asp Asp Leu Leu Ala
485                               490                               495
Phe Leu Ala Pro Ile Thr His Pro Glu Arg Leu Gly Lys Pro Asn Ser
500                               505                               510
Gln Ile Glu Tyr Thr Glu Asp Glu Val Arg Ile Ala Gln Leu Ala Asp
515                               520                               525
Lys Tyr Thr Thr Ser Asp Gly Tyr Ile Phe Asp Glu His Asp Ile Ile
530                               535                               540
Ser Asp Glu Gly Asp Ala Tyr Val Thr Pro His Met Gly His Ser His
545                               550                               555
Trp Ile Gly Lys Asp Ser Leu Ser Asp Lys Glu Lys Val Ala Ala Gln
565                               570                               575
Ala Tyr Thr Lys Glu Lys Gly Ile Leu Pro Pro Ser Pro Asp Ala Asp
580                               585                               590

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1028462\_1.TXT

Val Lys Ala Asn Pro Thr Gly Asp Ser Ala Ala Ala Ile Tyr Asn Arg  
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Val Lys Gly Glu Lys Arg Ile Pro Leu Val Arg Leu Pro Tyr Met Val  
610 615 620

Glu His Thr Val Glu Val Lys Asn Gly Asn Leu Ile Ile Pro His Lys  
625 630 635 640

Asp His Tyr His Asn Ile Lys Phe Ala Trp Phe Asp Asp His Thr Tyr  
645 650 655

Lys Ala Pro Asn Gly Tyr Thr Leu Glu Asp Leu Phe Ala Thr Ile Lys  
660 665 670

Tyr Tyr Val Glu His Pro Asp Glu Arg Pro His Ser Asn Asp Gly Trp  
675 680 685

Gly Asn Ala Ser Glu His Val Leu Gly Lys Lys Asp His Ser Glu Asp  
690 695 700

Pro Asn Lys Asn Phe Lys Ala Asp Glu Glu Pro Val Glu Glu Thr Pro  
705 710 715 720

Ala Glu Pro Glu Val Pro Gln Val Glu Thr Glu Lys Val Glu Ala Gln  
725 730 735

Leu Lys Glu Ala Glu Val Leu Leu Ala Lys Val Thr Asp Ser Ser Leu  
740 745 750

Lys Ala Asn Ala Thr Glu Thr Leu Ala Gly Leu Arg Asn Asn Leu Thr  
755 760 765

Leu Gln Ile Met Asp Asn Asn Ser Ile Met Ala Glu Ala Glu Lys Leu  
770 775 780

Leu Ala Leu Leu Lys Gly Ser Asn Pro Ser Ser Val Ser Lys Glu Lys  
785 790 795 800

Ile Asn

<210> 195  
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<213> Streptococcus pneumoniae  
<400> 195

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 20 25 30  
 Gly Tyr Thr Glu Arg Asp Val Thr Gln Arg Ile Lys Glu Gln Thr His  
 35 40 45  
 Thr Ala His Ile Ala Thr Asp Val Leu Trp Thr Gly Asp Ala Ala Tyr  
 50 55 60  
 Thr Glu Glu Pro Asp Lys Gly Lys Thr Phe Lys Asp His Asp Phe His  
 65 70 75 80  
 His Phe Leu Ser Phe His Asp Val Glu Arg Arg Pro Lys Thr Glu Trp  
 85 90 95  
 Phe Tyr Phe Asn Gly Thr Pro Glu Lys Ser Lys Asn Leu Phe Asp Lys  
 100 105 110  
 Phe Val Gln His Asp Leu Ser Gly Tyr Gln Pro Gly Lys Gly Gln Asp  
 115 120 125  
 Tyr Thr Leu Arg Gln Glu Gln Glu Glu Ala Val Ala Lys Thr Leu Ala  
 130 135 140  
 Tyr Phe Gln Glu His Ala Gly Gly Lys Phe Leu Trp Asn Ala Lys Pro  
 145 150 155 160  
 Arg Phe Gly Lys Thr Leu Ser Thr Tyr Asp Leu Ala Arg Arg Met Glu  
 165 170 175  
 Ala Val Asn Val Leu Ile Val Thr Asn Arg Pro Ala Ile Ala Asn Ser  
 180 185 190  
 Trp Tyr Asp Asp Phe Glu Thr Phe Ile Ala Gly Gln Thr Thr Tyr Lys  
 195 200 205  
 Phe Val Ser Glu Ser Asp Ser Leu Lys Ser Arg Pro Ile Leu Ser Arg  
 210 215 220  
 Gln Glu Phe Leu Gly Ile Leu Ala Asp Asp Val Arg Gln Leu Ala Phe  
 225 230 235 240  
 Ile Ser Leu Gln Asp Leu Lys Gly Ser Val Tyr Leu Gly Gly Glu His  
 245 250 255

## 1028462\_1.TXT

Asp Lys Leu Lys Trp Val Thr Asp Leu His Trp Asp Leu Leu Val Ile  
 260 265 270  
 Asp Glu Ala His Glu Gly Val Asp Thr Phe Lys Thr Asp Gln Ala Phe  
 275 280 285  
 Asn Lys Ile Arg Arg Asn Phe Thr Leu His Leu Ser Gly Thr Ser Phe  
 290 295 300  
 Lys Ala Leu Ala Lys Gly Asp Phe Thr Glu Glu Gln Ile Tyr Asn Trp  
 305 310 315 320  
 Ser Tyr Ala Asp Glu Gln Ala Ala Lys Tyr Ser Trp Ser Leu Glu Gln  
 325 330 335  
 Glu Glu Glu Asn Pro Tyr Glu Ser Leu Pro Gln Leu Asn Leu Phe Thr  
 340 345 350  
 Tyr Gln Met Ser Gln Met Ile Gly Glu Lys Leu Glu Lys Gly Ala Gln  
 355 360 365  
 Ile Asp Gly Glu Asn Ile Asp Tyr Val Phe Asp Leu Ser Glu Phe Phe  
 370 375 380  
 Ala Thr Asp Asp Lys Gly Lys Phe Ile His Glu His Asp Val Arg Asn  
 385 390 395 400  
 Trp Leu Asp Thr Leu Ser Ser Asn Glu Lys Tyr Pro Phe Ser Thr Lys  
 405 410 415  
 Glu Leu Arg Asn Glu Leu Lys His Thr Phe Trp Leu Leu Glu Arg Val  
 420 425 430  
 Ala Ser Ala Lys Ala Leu Lys Ala Leu Leu Glu Glu His Pro Ile Tyr  
 435 440 445  
 Glu Asn Tyr Glu Ile Val Leu Ala Ala Gly Asp Gly Arg Met Ser Glu  
 450 455 460  
 Glu Asp Asp Lys Val Lys Leu Lys Ser Leu Asp Leu Val Arg Lys Ala  
 465 470 475 480  
 Ile Ala Glu Asn Asp Lys Thr Ile Thr Leu Ser Val Gly Gln Leu Thr  
 485 490 495  
 Thr Gly Val Thr Ile Pro Glu Trp Thr Gly Val Leu Met Leu Ser Asn  
 500 505 510

1028462\_1.TXT

Leu Lys Ser Pro Ala Leu Tyr Met Gln Ala Ala Phe Arg Ala Gln Asn  
 515 520 525  
 Pro Tyr Ser Trp Ser Asp Asn Lys Gly Asn His Phe Arg Lys Glu Arg  
 530 535 540  
 Ala Tyr Val Phe Asp Phe Ala Pro Glu Arg Thr Leu Ile Leu Phe Asp  
 545 550 555 560  
 Glu Phe Ala Asn Asn Leu Leu Leu Val Thr Ala Ala Gly Arg Gly Thr  
 565 570 575  
 Ser Ala Thr Arg Glu Glu Asn Ile Arg Glu Leu Leu Asn Phe Phe Pro  
 580 585 590  
 Ile Ile Ala Glu Asp Arg Ala Gly Lys Met Val Glu Ile Asp Ala Lys  
 595 600 605  
 Ala Val Leu Thr Thr Pro Arg Gln Ile Lys Ala Arg Glu Val Leu Lys  
 610 615 620  
 Arg Gly Phe Met Ser Asn Leu Leu Phe Asp Asn Ile Ser Gly Ile Phe  
 625 630 635 640  
 Gln Ala Ser Gln Thr Val Leu Asp Ile Leu Asn Glu Leu Pro Val Glu  
 645 650 655  
 Lys Glu Gly Lys Val Gln Asp Ser Ser Asp Leu Leu Asp Phe Ser Asp  
 660 665 670  
 Val Thr Val Asp Asp Glu Gly Asn Ala Val Val Asp His Glu Ile Val  
 675 680 685  
 Val Asn Gln Gln Met Arg Leu Phe Gly Glu Lys Val Tyr Gly Leu Gly  
 690 695 700  
 Glu Ser Val Ala Glu Leu Val Thr Lys Asp Glu Glu Arg Thr Gln Lys  
 705 710 715 720  
 Gln Leu Val Asn Asp Leu Ser Lys Thr Val Ser Ser Val Ile Val Glu  
 725 730 735  
 Glu Leu Lys Ala Asp Tyr Ser Leu Lys Thr Arg Glu Thr Glu Gln Ile  
 740 745 750  
 Lys Lys Gln Ile Thr Ala Thr Leu Glu Asn Glu Ile Arg Lys Asn Asp



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755                               760                               765
Ile Glu Arg Lys Ile Ser Glu Ala His Ile Lys Gln Glu Leu Gln Gln
770                               775                               780

Gln Leu Lys Glu Ala Asn Asp Lys Ala Gln Lys Asp Lys Ile Gln Glu
785                               790                               795                               800

Asp Leu Glu Lys Arg Leu Glu Glu Asn Lys Leu Ile His Lys Glu Lys
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Leu Glu Gln Thr Leu Lys Lys Glu Val Glu Lys Met Pro Glu Lys Phe
820                               825                               830

Ile Glu Gln Val Glu Ile Lys Arg Val Glu Gln Leu Lys Gln Ser Ala
835                               840                               845

Gln Asp Glu Ile Arg Asp His Leu Arg Gly Phe Ala Arg Thr Ile Pro
850                               855                               860

Ser Phe Ile Met Ala Tyr Gly Asp Gln Thr Leu Thr Leu Asp Asn Phe
865                               870                               875                               880

Asp Ala Phe Val Pro Glu His Val Phe Tyr Glu Val Thr Gly Ile Thr
885                               890                               895

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His Leu Phe Asp Lys Ala Thr Phe Asp Glu Ala Ile Gln Glu Phe Leu
915                               920                               925

Arg Lys Lys Lys Glu Leu Ala Asp Tyr Phe Lys Asp Gln Lys Glu Asp
930                               935                               940

Ile Phe Asp Tyr Ile Pro Pro Gln Lys Thr Asn Gln Ile Phe Thr Pro
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Lys Arg Val Val Lys Arg Met Val Asp Asp Leu Glu Lys Glu Asn Pro
965                               970                               975

Gly Ile Phe Asp Asp Pro Ser Lys Thr Phe Ile Asp Leu Tyr Met Lys
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Ser Gly Leu Tyr Ile Ala Glu Leu Val Lys Arg Leu Tyr Asn Ser Asn
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1028462\_1.TXT

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Tyr Asn Ile Ser Thr Asn Phe Ile Phe Gly Asn Leu Ser Lys Asp  
1040 1045 1050

Ile Ser Arg Lys Asn Phe Val Leu Ala Asp Thr Ile Pro Ala Ala  
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Asn

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<400> 196

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35 40 45

Ile Ile Leu Asp Leu Met Leu Pro Glu Ile Asp Gly Leu Glu Val Ala  
50 55 60

Lys Thr Ile Arg Lys Thr Ser Ser Val Pro Ile Leu Met Leu Ser Ala  
65 70 75 80

Lys Asp Ser Glu Phe Asp Lys Val Ile Gly Leu Glu Leu Gly Ala Asp  
85 90 95

Asp Tyr Val Thr Lys Pro Phe Ser Asn Arg Glu Leu Gln Ala Arg Val  
100 105 110

Lys Ala Leu Leu Arg Arg Ser Gln Pro Met Pro Val Asp Gly Gln Glu  
115 120 125

1028462\_1.TXT

Ala Asp Ser Lys Pro Gln Pro Ile Gln Ile Gly Asp Leu Glu Ile Val  
130 135 140

Pro Asp Ala Tyr Val Ala Lys Lys Tyr Gly Glu Glu Leu Asp Leu Thr  
145 150 155 160

His Arg Glu Phe Glu Leu Leu Tyr His Leu Ala Ser His Thr Gly Gln  
165 170 175

Val Ile Thr Arg Glu His Leu Leu Glu Thr Val Trp Gly Tyr Asp Tyr  
180 185 190

Phe Gly Asp Val Arg Thr Val Asp Val Thr Val Arg Arg Leu Arg Glu  
195 200 205

Lys Ile Glu Asp Thr Pro Ser Arg Pro Glu Tyr Ile Leu Thr Arg Arg  
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Gly Val Gly Tyr Tyr Met Arg Asn Asn Ala  
225 230

<210> 197  
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<400> 197

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Ala Tyr Ala Pro Phe Glu Phe Lys Asp Ser Asp Gln Thr Tyr Lys Gly  
35 40 45

Ile Asp Val Asp Ile Ile Asn Lys Val Ala Glu Ile Lys Gly Trp Asn  
50 55 60

Ile Gln Met Ser Tyr Pro Gly Phe Asp Ala Ala Val Asn Ala Val Gln  
65 70 75 80

Ala Gly Gln Ala Asp Ala Ile Met Ala Gly Met Thr Lys Thr Lys Glu  
85 90 95

Arg Glu Lys Val Phe Thr Met Ser Asp Thr Tyr Tyr Asp Thr Lys Val  
100 105 110

## 1028462\_1.TXT

Val Ile Ala Thr Thr Lys Ser His Lys Ile Ser Lys Tyr Asp Gln Leu  
 115 120 125  
 Thr Gly Lys Thr Val Gly Val Lys Asn Gly Thr Ala Ala Gln Arg Phe  
 130 135 140  
 Leu Glu Thr Ile Lys Asp Lys Tyr Gly Phe Thr Ile Lys Thr Phe Asp  
 145 150 155 160  
 Thr Gly Asp Leu Met Asn Asn Ser Leu Ser Ala Gly Ala Ile Asp Ala  
 165 170 175  
 Met Met Asp Asp Lys Pro Val Ile Glu Tyr Ala Ile Asn Gln Gly Gln  
 180 185 190  
 Asp Leu His Ile Glu Met Asp Gly Glu Ala Val Gly Ser Phe Ala Phe  
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 Gly Val Lys Lys Gly Ser Lys Tyr Glu His Leu Val Thr Glu Phe Asn  
 210 215 220  
 Gln Ala Leu Ser Glu Met Lys Lys Asp Gly Ser Leu Asp Lys Ile Ile  
 225 230 235 240  
 Lys Lys Trp Thr Ala Ser Ser Ser Ser Ala Val Pro Thr Thr Thr Thr  
 245 250 255  
 Leu Ala Gly Leu Lys Ala Ile Pro Val Lys Ala Lys Tyr Ile Ile Ala  
 260 265 270  
 Ser Asp Ser Ser Phe Ala Pro Phe Val Phe Gln Asn Ser Ser Asn Gln  
 275 280 285  
 Tyr Thr Gly Ile Asp Met Glu Leu Ile Lys Ala Ile Ala Lys Asp Gln  
 290 295 300  
 Gly Phe Glu Ile Glu Ile Thr Asn Pro Gly Phe Asp Ala Ala Ile Ser  
 305 310 315 320  
 Ala Val Gln Ala Gly Gln Ala Asp Gly Ile Ile Ala Gly Met Ser Val  
 325 330 335  
 Thr Asp Ala Arg Lys Ala Thr Phe Asp Phe Ser Glu Ser Tyr Tyr Thr  
 340 345 350  
 Ala Asn Thr Ile Leu Gly Val Lys Glu Ser Ser Asn Ile Ala Ser Tyr  
 355 360 365

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Glu Asp Leu Lys Gly Lys Thr Val Gly Val Lys Asn Gly Thr Ala Ser  
 370 375 380  
 Gln Thr Phe Leu Thr Glu Asn Gln Ser Lys Tyr Gly Tyr Lys Ile Lys  
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 Thr Phe Ala Asp Gly Ser Ser Met Tyr Asp Ser Leu Asn Thr Gly Ala  
 405 410 415  
 Ile Asp Ala Val Met Asp Asp Glu Pro Val Leu Lys Tyr Ser Ile Ser  
 420 425 430  
 Gln Gly Gln Lys Leu Lys Thr Pro Ile Ser Gly Thr Pro Ile Gly Glu  
 435 440 445  
 Thr Ala Phe Ala Val Lys Lys Gly Ala Asn Pro Glu Leu Ile Glu Met  
 450 455 460  
 Phe Asn Asn Gly Leu Ala Asn Leu Lys Ala Asn Gly Glu Phe Gln Lys  
 465 470 475 480  
 Ile Leu Asp Lys Tyr Leu Ala Ser Glu Ser Ser Thr Ala Ser Thr Ser  
 485 490 495  
 Thr Val Asp Glu Thr Thr Leu Trp Gly Leu Leu Gln Asn Asn Tyr Lys  
 500 505 510  
 Gln Leu Leu Ser Gly Leu Gly Ile Thr Leu Ala Leu Ala Leu Ile Ser  
 515 520 525  
 Phe Ala Ile Ala Ile Val Ile Gly Ile Ile Phe Gly Met Phe Ser Val  
 530 535 540  
 Ser Pro Tyr Lys Ser Leu Arg Val Ile Ser Glu Ile Phe Val Asp Val  
 545 550 555 560  
 Ile Arg Gly Ile Pro Leu Met Ile Leu Ala Ala Phe Ile Phe Trp Gly  
 565 570 575  
 Ile Pro Asn Phe Ile Glu Ser Ile Thr Gly Gln Gln Ser Pro Ile Asn  
 580 585 590  
 Asp Phe Val Ala Gly Thr Ile Ala Leu Ser Leu Asn Ala Ala Ala Tyr  
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 Ile Ala Glu Ile Val Arg Gly Gly Ile Gln Ala Val Pro Val Gly Gln  
 610 615 620

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Met Glu Ala Ser Arg Ser Leu Gly Ile Ser Tyr Gly Lys Thr Met Arg  
625 630 635 640

Lys Ile Ile Leu Pro Gln Ala Thr Lys Leu Met Leu Pro Asn Phe Val  
645 650 655

Asn Gln Phe Val Ile Ala Leu Lys Asp Thr Thr Ile Val Ser Ala Ile  
660 665 670

Gly Leu Val Glu Leu Phe Gln Thr Gly Lys Ile Ile Ile Ala Arg Asn  
675 680 685

Tyr Gln Ser Phe Lys Met Tyr Ala Ile Leu Ala Ile Phe Tyr Leu Val  
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Arg

<210> 198  
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<213> Streptococcus pneumoniae  
<400> 198

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35 40 45

Val Lys Asp Phe Ile Lys Lys Val Arg Glu Arg Ala Val Gly His Glu  
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Val Ile Asp Thr Leu Asn Pro Ala Gln Gln Ile Ile Lys Ile Val Asp  
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Glu Glu Leu Thr Ala Val Leu Gly Ser Asp Thr Ala Glu Ile Ile Lys  
85 90 95

Ser Pro Lys Ile Pro Thr Ile Ile Met Met Val Gly Leu Gln Gly Ala  
100 105 110

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Gly Lys Thr Thr Phe Ala Gly Lys Leu Ala Asn Lys Leu Lys Lys Glu  
115 120 125

Glu Asn Ala Arg Pro Leu Met Ile Ala Ala Asp Ile Tyr Arg Pro Ala  
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Ala Ile Asp Gln Leu Lys Thr Leu Gly Gln Gln Ile Asp Val Pro Val  
145 150 155 160

Phe Ala Leu Gly Thr Glu Val Pro Ala Val Glu Ile Val Arg Gln Gly  
165 170 175

Leu Glu Gln Ala Gln Thr Asn His Asn Asp Tyr Val Leu Ile Asp Thr  
180 185 190

Ala Gly Arg Leu Gln Ile Asp Glu Leu Leu Met Asn Glu Leu Arg Asp  
195 200 205

Val Lys Ala Leu Ala Gln Pro Asn Glu Ile Leu Leu Val Val Asp Ala  
210 215 220

Met Ile Gly Gln Glu Ala Ala Asn Val Ala Arg Glu Phe Asn Ala Gln  
225 230 235 240

Leu Glu Val Thr Gly Val Ile Leu Thr Lys Ile Asp Gly Asp Thr Arg  
245 250 255

Gly Gly Ala Ala Leu Ser Val Arg His Ile Thr Gly Lys Pro Ile Lys  
260 265 270

Phe Thr Gly Thr Gly Glu Lys Ile Thr Asp Ile Glu Thr Phe His Pro  
275 280 285

Asp Arg Met Ser Ser Arg Ile Leu Gly Met Gly Asp Met Leu Thr Leu  
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Ile Glu Lys Ala Ser Gln Glu Tyr Asp Glu Gln Lys Ala Leu Glu Met  
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Ala Glu Lys Met Arg Glu Asn Thr Phe Asp Phe Asn Asp Phe Ile Asp  
325 330 335

Gln Leu Asp Gln Val Gln Asn Met Gly Pro Met Glu Asp Leu Leu Lys  
340 345 350

Met Ile Pro Gly Met Ala Asn Asn Pro Ala Leu Gln Asn Met Lys Val  
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355

360

365

Asp Glu Arg Gln Ile Ala Arg Lys Arg Ala Ile Val Ser Ser Met Thr  
 370 375 380

Pro Glu Glu Arg Glu Asn Pro Asp Leu Leu Asn Pro Ser Arg Arg Arg  
 385 390 395 400

Arg Ile Ala Ala Gly Ser Gly Asn Thr Phe Val Glu Val Asn Lys Phe  
 405 410 415

Ile Lys Asp Phe Asn Gln Ala Lys Gln Leu Met Gln Gly Val Met Ser  
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Gly Asp Met Asn Lys Met Met Lys Gln Met Gly Ile Asn Pro Asn Asn  
 435 440 445

Leu Pro Lys Asn Met Pro Asn Met Gly Gly Met Asp Met Ser Ala Leu  
 450 455 460

Glu Gly Met Met Gly Gln Gly Gly Met Pro Asp Leu Ser Ala Leu Gly  
 465 470 475 480

Gly Ala Gly Met Pro Asp Met Ser Gln Met Phe Gly Gly Gly Leu Lys  
 485 490 495

Gly Lys Ile Gly Glu Phe Ala Met Lys Gln Ser Met Lys Arg Met Ala  
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Asn Lys Met Lys Lys Ala Lys Lys Lys Arg Lys  
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<210> 199

<211> 233

<212> PRT

<213> Streptococcus pneumoniae

<400> 199

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 20 25 30

Glu Glu Phe Ser Leu Met Pro Phe Met Ala Lys Ala Ala Leu Glu Ala  
 35 40 45

Gly Ala Val Gly Ile Arg Ala Asn Ser Val Arg Asp Ile Lys Ala Ile  
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50

55

Gln Lys Val Val Asp Leu Pro Ile Ile Gly Ile Ile Lys Arg Asp Tyr  
65 70 75 80

Pro Pro Gln Glu Pro Tyr Ile Thr Ala Thr Met Lys Glu Val Asp Glu  
85 90 95

Leu Val Glu Cys Gly Thr Thr Val Ile Ala Phe Asp Ala Thr Leu Arg  
100 105 110

Pro Arg Tyr Asp Gly Leu Val Val Ser Glu Phe Ile Lys Lys Ile Lys  
115 120 125

Glu Lys Tyr Pro Asn Gln Leu Leu Met Ala Asp Val Ser Asn Leu Asp  
130 135 140

Glu Gly Leu Tyr Ala Phe Lys Ser Gly Val Asp Phe Val Gly Thr Thr  
145 150 155 160

Leu Ser Gly Tyr Thr Ser Thr Ser Val Gln Ser Asp Glu Pro Asp Phe  
165 170 175

Glu Leu Met Lys Lys Leu Ala Asp Phe Asn Ile Pro Val Ile Ala Glu  
180 185 190

Gly Lys Ile His Tyr Pro Glu Gln Leu Lys Lys Ala Tyr Ser Leu Gly  
195 200 205

Val Thr Ser Val Val Ile Gly Gly Ala Ile Thr Arg Pro Lys Glu Ile  
210 215 220

Ala Gln Arg Phe Ile Asn Val Ile Lys  
225 230

<210> 200  
<211> 388  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 200

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1 5 10 15

Ile Ile Glu Gly Ile Pro Ala Gly Leu Pro Leu Thr Ala Glu Asp Ile  
20 25 30

Asn Glu Asp Leu Arg Arg Arg Gln Gly Gly Tyr Gly Arg Gly Gly Arg  
Page 269

35 40 45  
 Met Lys Ile Glu Asn Asp Gln Val Val Phe Thr Ser Gly Val Arg His  
 50 55 60  
 Gly Lys Thr Thr Gly Ala Pro Ile Thr Met Asp Val Ile Asn Lys Asp  
 65 70 75 80  
 His Gln Lys Trp Leu Asp Ile Met Ser Ala Glu Asp Ile Glu Asp Arg  
 85 90 95  
 Leu Lys Ser Lys Arg Lys Ile Thr His Pro Arg Pro Gly His Ala Asp  
 100 105 110  
 Leu Val Gly Gly Ile Lys Tyr Arg Phe Asp Asp Leu Arg Asn Ser Leu  
 115 120 125  
 Glu Arg Ser Ser Ala Arg Glu Thr Thr Met Arg Val Ala Val Gly Ala  
 130 135 140  
 Val Ala Lys Arg Leu Leu Ala Glu Leu Asp Met Glu Ile Ala Asn His  
 145 150 155 160  
 Val Val Val Phe Gly Gly Lys Glu Ile Asp Val Pro Glu Asn Leu Thr  
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 Val Ala Glu Ile Lys Gln Arg Ala Ala Gln Ser Glu Val Ser Ile Val  
 180 185 190  
 Asn Gln Glu Arg Glu Gln Glu Ile Lys Asp Tyr Ile Asp Gln Ile Lys  
 195 200 205  
 Arg Asp Gly Asp Thr Ile Gly Gly Val Val Glu Thr Val Val Gly Gly  
 210 215 220  
 Val Pro Val Gly Leu Gly Ser Tyr Val Gln Trp Asp Arg Lys Leu Asp  
 225 230 235 240  
 Ala Arg Leu Ala Gln Ala Val Val Ser Ile Asn Ala Phe Lys Gly Val  
 245 250 255  
 Glu Phe Gly Leu Gly Phe Glu Ala Gly Tyr Arg Lys Gly Ser Gln Val  
 260 265 270  
 Met Asp Glu Ile Leu Trp Ser Lys Glu Asp Gly Tyr Thr Arg Arg Thr  
 275 280 285

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Asn Asn Leu Gly Gly Phe Glu Gly Gly Met Thr Asn Gly Gln Pro Ile  
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Val Val Arg Gly Val Met Lys Pro Ile Pro Thr Leu Tyr Lys Pro Leu  
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Met Ser Val Asp Ile Glu Thr His Glu Pro Tyr Lys Ala Thr Val Glu  
 325 330 335

Arg Ser Asp Pro Thr Ala Leu Pro Ala Ala Gly Met Val Met Glu Ala  
 340 345 350

Val Val Ala Thr Val Leu Ala Gln Glu Ile Leu Glu Lys Phe Ser Ser  
 355 360 365

Asp Asn Leu Glu Glu Leu Lys Glu Ala Val Ala Lys His Arg Asp Tyr  
 370 375 380

Thr Lys Asn Tyr  
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<210> 201  
 <211> 390  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 201

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 20 25 30

Asn Leu Lys Asp Gln Glu Val Glu Val Gln Gly Gln Glu Gly Asn Phe  
 35 40 45

Leu Gly Thr Ala Tyr Leu Ser Gln Gln Asn Lys Gly Leu Gly Trp Phe  
 50 55 60

Ile Ser Lys Asp Lys Val Ala Phe Asn Gln Ala Phe Phe Glu Thr Leu  
 65 70 75 80

Phe Arg Lys Ala Lys Glu Lys Arg Asn Ala Tyr Tyr Gln Asp Asp Leu  
 85 90 95

Thr Thr Ala Phe Arg Leu Phe Asn Gln Glu Gly Asp Gly Phe Gly Gly  
 100 105 110

Leu Thr Val Asp Leu Tyr Gly Asp Tyr Ala Val Phe Ser Trp Tyr Asn  
 115 120 125  
 Ser Tyr Val Tyr Gln Ile Arg Gln Thr Ile Ser Glu Ala Phe Arg Gln  
 130 135 140  
 Val Phe Pro Glu Val Leu Gly Ala Tyr Glu Lys Ile Arg Phe Lys Gly  
 145 150 155 160  
 Leu Asp Tyr Glu Ser Ala His Val Tyr Gly Gln Glu Ala Pro Asp Phe  
 165 170 175  
 Phe Asn Val Leu Glu Asn Gly Val Leu Tyr Gln Val Phe Met Asn Asp  
 180 185 190  
 Gly Leu Met Thr Gly Ile Phe Leu Asp Gln His Glu Val Arg Gly Ser  
 195 200 205  
 Leu Val Asp Gly Leu Ala Met Gly Lys Ser Leu Leu Asn Met Phe Ser  
 210 215 220  
 Tyr Thr Ala Ala Phe Ser Val Ala Ala Ala Met Gly Gly Ala Ser His  
 225 230 235 240  
 Thr Thr Ser Val Asp Leu Ala Lys Arg Ser Arg Glu Leu Ser Gln Ala  
 245 250 255  
 His Phe Gln Ala Asn Gly Leu Ser Thr Asp Glu His Arg Phe Ile Val  
 260 265 270  
 Met Asp Val Phe Glu Tyr Phe Lys Tyr Ala Lys Arg Lys Asp Leu Thr  
 275 280 285  
 Tyr Asp Val Ile Val Leu Asp Pro Pro Ser Phe Ala Arg Asn Lys Lys  
 290 295 300  
 Gln Thr Phe Ser Val Ala Lys Asp Tyr His Lys Leu Ile Ser Gln Ser  
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 Leu Glu Ile Leu Asn Pro Gly Gly Ile Ile Ile Ala Ser Thr Asn Ala  
 325 330 335  
 Ala Asn Val Ser Arg Gln Lys Phe Thr Glu Gln Ile Asp Lys Gly Phe  
 340 345 350  
 Ala Gly Arg Ser Tyr Gln Ile Leu Asn Lys Tyr Gly Leu Pro Ala Asp  
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Phe Ala Tyr Asn Lys Lys Asp Glu Ser Ser Asn Tyr Leu Lys Val Ile  
370 375 380

Ser Met Lys Val Ser Lys  
385 390

<210> 202  
<211> 428  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 202

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Leu Glu Lys Leu Lys Val Ala Val Gln Tyr Gly Ala Asp Ala Val Phe  
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Ile Gly Gly Gln Ala Tyr Gly Leu Arg Ser Arg Ala Gly Asn Phe Thr  
35 40 45

Phe Glu Gln Met Glu Glu Gly Val Gln Phe Ala Ala Lys Tyr Gly Ala  
50 55 60

Lys Val Tyr Val Ala Ala Asn Met Val Met His Glu Gly Asn Glu Ala  
65 70 75 80

Gly Ala Gly Glu Trp Phe Arg Lys Leu Arg Asp Ile Gly Ile Ala Ala  
85 90 95

Val Ile Val Ser Asp Pro Ala Leu Ile Met Ile Ala Val Thr Glu Ala  
100 105 110

Pro Gly Leu Glu Ile His Leu Ser Thr Gln Ala Ser Ala Thr Asn Tyr  
115 120 125

Glu Thr Leu Glu Phe Trp Lys Glu Leu Gly Leu Thr Arg Val Val Leu  
130 135 140

Ala Arg Glu Val Ser Met Glu Glu Leu Ala Glu Ile Arg Lys Arg Thr  
145 150 155 160

Asp Val Glu Ile Glu Ala Phe Val His Gly Ala Met Cys Ile Ser Tyr  
165 170 175

Ser Gly Arg Cys Thr Leu Ser Asn His Met Ser Met Arg Asp Ala Asn  
180 185 190

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Arg Gly Gly Cys Ser Gln Ser Cys Arg Trp Lys Tyr Asp Leu Tyr Asp  
195 200 205

Met Pro Phe Gly Lys Glu Arg Lys Ser Leu Gln Gly Glu Ile Pro Glu  
210 215 220

Glu Phe Ser Met Ser Ala Val Asp Met Ser Met Ile Asp His Ile Pro  
225 230 235 240

Asp Met Ile Glu Asn Gly Val Asp Ser Leu Lys Ile Glu Gly Arg Met  
245 250 255

Lys Ser Ile His Tyr Val Ser Thr Val Thr Asn Cys Tyr Lys Ala Ala  
260 265 270

Val Asp Ala Tyr Leu Glu Ser Pro Glu Lys Phe Glu Ala Ile Lys Gln  
275 280 285

Asp Leu Val Asp Glu Met Trp Lys Val Ala Gln Arg Glu Leu Ala Thr  
290 295 300

Gly Phe Tyr Tyr Gly Thr Pro Ser Glu Asn Glu Gln Leu Phe Gly Ala  
305 310 315 320

Arg Arg Lys Ile Pro Glu Tyr Lys Phe Val Ala Glu Val Val Ser Tyr  
325 330 335

Asp Asp Ala Ala Gln Thr Ala Thr Ile Arg Gln Arg Asn Val Ile Asn  
340 345 350

Glu Gly Asp Gln Val Glu Phe Tyr Gly Pro Gly Phe Arg His Phe Glu  
355 360 365

Thr Tyr Ile Glu Asp Leu His Asp Ala Lys Gly Asn Lys Ile Asp Arg  
370 375 380

Ala Pro Asn Pro Met Glu Leu Leu Thr Ile Lys Val Pro Gln Pro Val  
385 390 395 400

Gln Ser Gly Asp Met Val Arg Ala Leu Lys Glu Gly Leu Ile Asn Leu  
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Tyr Lys Glu Asp Gly Thr Ser Val Thr Val Arg Ala  
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<210> 203  
<211> 280

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 203

Met Asn Thr Tyr Gln Leu Asn Asn Gly Val Glu Ile Pro Val Leu Gly  
 1 5 10 15

Phe Gly Thr Phe Lys Ala Lys Asp Gly Glu Glu Ala Tyr Arg Ala Val  
 20 25 30

Leu Glu Ala Leu Lys Ala Gly Tyr Arg His Ile Asp Thr Ala Ala Ile  
 35 40 45

Tyr Gln Asn Glu Glu Ser Val Gly Gln Ala Ile Lys Asp Ser Gly Val  
 50 55 60

Pro Arg Glu Glu Met Phe Val Thr Thr Lys Leu Trp Asn Ser Gln Gln  
 65 70 75 80

Thr Tyr Glu Gln Thr Arg Gln Ala Leu Glu Lys Ser Ile Glu Lys Leu  
 85 90 95

Gly Leu Asp Tyr Leu Asp Leu Tyr Leu Ile His Trp Pro Asn Pro Lys  
 100 105 110

Pro Leu Arg Glu Asn Asp Ala Trp Lys Thr Arg Asn Ala Glu Val Trp  
 115 120 125

Arg Ala Met Glu Asp Leu Tyr Gln Glu Gly Lys Ile Arg Ala Ile Gly  
 130 135 140

Val Ser Asn Phe Leu Pro His His Leu Asp Ala Leu Leu Glu Thr Ala  
 145 150 155 160

Thr Ile Val Pro Ala Val Asn Gln Val Arg Leu Ala Pro Gly Val Tyr  
 165 170 175

Gln Asp Gln Val Val Ala Tyr Cys Arg Glu Lys Gly Ile Leu Leu Glu  
 180 185 190

Ala Trp Gly Pro Phe Gly Gln Gly Glu Leu Phe Asp Ser Lys Gln Val  
 195 200 205

Gln Glu Ile Ala Ala Asn His Gly Lys Ser Val Ala Gln Ile Ala Leu  
 210 215 220

Ala Trp Ser Leu Ala Glu Gly Phe Leu Pro Leu Pro Lys Ser Val Thr  
 225 230 235 240

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Thr Ser Arg Ile Gln Ala Asn Leu Asp Cys Phe Gly Ile Glu Leu Ser  
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260 265 270

Pro Arg Val Asp Asp Val Asp Phe  
275 280

<210> 204  
<211> 551  
<212> PRT  
<213> Streptococcus pneumoniae  
<400> 204

Leu Ser Glu Lys Ser Arg Glu Glu Glu Lys Leu Ser Phe Lys Glu Gln  
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20 25 30

Glu Asp Glu Ala Val Val Arg Thr Pro Ala Asn Glu Pro Ser Thr Glu  
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Glu Leu Met Ala Asp Ser Leu Ser Thr Val Glu Glu Ile Met Arg Lys  
50 55 60

Ala Pro Thr Val Pro Thr His Pro Ser Gln Gly Val Pro Ala Ser Pro  
65 70 75 80

Ala Asp Glu Ile Gln Arg Glu Thr Pro Gly Val Pro Ser His Pro Ser  
85 90 95

Gln Asp Val Pro Ser Ser Pro Ala Glu Glu Ser Gly Ser Arg Pro Gly  
100 105 110

Pro Gly Pro Val Arg Pro Lys Lys Leu Glu Arg Glu Tyr Asn Glu Thr  
115 120 125

Pro Thr Arg Val Ala Val Ser Tyr Thr Thr Ala Glu Lys Lys Ala Glu  
130 135 140

Gln Ala Gly Pro Glu Thr Pro Thr Pro Ala Thr Glu Thr Val Asp Ile  
145 150 155 160

Ile Arg Asp Thr Ser Arg Arg Ser Arg Arg Glu Gly Ala Lys Pro Val  
165 170 175



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Lys Pro Lys Lys Glu Lys Lys Ser His Val Lys Ala Phe Val Ile Ser  
 180 185 190  
 Phe Leu Val Phe Leu Ala Leu Leu Ser Ala Gly Gly Tyr Phe Gly Tyr  
 195 200 205  
 Gln Tyr Val Leu Asp Ser Leu Leu Pro Ile Asp Ala Asn Ser Lys Lys  
 210 215 220  
 Tyr Val Thr Val Gly Ile Pro Glu Gly Ser Asn Val Gln Glu Ile Gly  
 225 230 235 240  
 Thr Thr Leu Glu Lys Ala Gly Leu Val Lys His Gly Leu Ile Phe Ser  
 245 250 255  
 Phe Tyr Ala Lys Tyr Lys Asn Tyr Thr Asp Leu Lys Ala Gly Tyr Tyr  
 260 265 270  
 Asn Leu Gln Lys Ser Met Ser Thr Glu Asp Leu Leu Lys Glu Leu Gln  
 275 280 285  
 Lys Gly Gly Thr Asp Glu Pro Gln Glu Pro Val Leu Ala Thr Leu Thr  
 290 295 300  
 Ile Pro Glu Gly Tyr Thr Leu Asp Gln Ile Ala Gln Ala Val Gly Gln  
 305 310 315 320  
 Leu Gln Gly Asp Phe Lys Glu Ser Leu Thr Ala Glu Ala Phe Leu Ala  
 325 330 335  
 Lys Val Gln Asp Glu Thr Phe Ile Ser Gln Ala Val Ala Lys Tyr Pro  
 340 345 350  
 Thr Leu Leu Glu Ser Leu Pro Val Lys Asp Ser Gly Ala Arg Tyr Arg  
 355 360 365  
 Leu Glu Gly Tyr Leu Phe Pro Ala Thr Tyr Ser Ile Lys Glu Ser Thr  
 370 375 380  
 Thr Ile Glu Ser Leu Ile Asp Glu Met Leu Ala Ala Met Asp Lys Asn  
 385 390 395 400  
 Leu Ser Pro Tyr Tyr Ser Thr Ile Lys Ser Lys Asn Leu Thr Val Asn  
 405 410 415  
 Glu Leu Leu Thr Ile Ala Ser Leu Val Glu Lys Glu Gly Ala Lys Thr  
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420

425

430

Glu Asp Arg Lys Leu Ile Ala Gly Val Phe Tyr Asn Arg Leu Asn Arg  
 435 440 445

Asp Met Pro Leu Gln Ser Asn Ile Ala Ile Leu Tyr Ala Gln Gly Lys  
 450 455 460

Leu Gly Gln Asn Ile Ser Leu Ala Glu Asp Val Ala Ile Asp Thr Asn  
 465 470 475 480

Ile Asp Ser Pro Tyr Asn Val Tyr Lys Asn Val Gly Leu Met Pro Gly  
 485 490 495

Pro Val Asp Ser Pro Ser Leu Asp Ala Ile Glu Ser Ser Ile Asn Gln  
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Thr Lys Ser Asp Asn Leu Tyr Phe Val Ala Asp Val Thr Glu Gly Lys  
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Val Tyr Tyr Ala Asn Asn Gln Glu Asp His Asp Arg Asn Val Ala Glu  
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His Val Asn Ser Lys Leu Asn  
 545 550

<210> 205  
 <211> 205  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 205

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Thr Glu Met Pro Val Met Asn Leu Tyr Asp Glu Ser Asp Leu Ile Ser  
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 35 40 45

Ile Ala Glu Glu Lys Pro Val Lys Pro Ile Glu Lys Gln Val Glu Lys  
 50 55 60

Pro Lys Lys Ala Pro Leu Gly Val Lys Lys Glu Gly Lys Ser Tyr Ala  
 65 70 75 80

Glu Val Ala Arg Glu Glu Ala Arg Ala Asp Leu Lys Lys Lys Arg Ser  
 Page 278

Ala Asn Tyr Leu Thr Gln Asp Phe Ser Leu Ala Arg Arg His Ser Gln  
100 105 110

Pro Ser Leu Val Arg Gln Gly Asn Gln Pro Thr Ala Pro Phe Gln Lys  
115 120 125

Glu Asn Pro Gly Glu Phe Val Lys Tyr Ser Gln Lys Leu Thr Gln Ser  
130 135 140

His Tyr Ile Leu Ala Glu Glu Val His Ser Ile Pro Thr Lys Asn Glu  
145 150 155 160

Glu Val Ser Ala Pro Ala Pro Lys Lys Asn Asn Tyr Asp Phe Leu Lys  
165 170 175

Lys Ser Gln Ile Tyr Asn Lys Lys Ser Lys Gln Thr Glu Gln Glu Arg  
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195 200 205

<210> 206  
<211> 652  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 206

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35 40 45

Leu Ala Glu Asn Arg Ala Ala Thr Ser Asp Ile Val Ala Asn Leu Val  
50 55 60

Asp Gly Leu Leu Glu Asn Asp Gln Tyr Gly Asn Ile Ile Pro Ser Leu  
65 70 75 80

Ala Glu Asp Trp Thr Val Ser Gln Asp Gly Leu Thr Tyr Thr Tyr Lys  
85 90 95

Leu Arg Lys Asp Ala Lys Trp Phe Thr Ser Glu Gly Glu Glu Tyr Ala  
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Pro Val Thr Ala Gln Asp Phe Val Thr Gly Leu Gln Tyr Ala Ala Asp
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Lys Lys Ser Glu Ala Leu Tyr Leu Val Gln Asp Ser Val Ala Gly Leu
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Asp Asp Tyr Ile Thr Gly Lys Thr Ser Asp Phe Ser Thr Val Gly Val
    145                               150                               155                               160
Lys Ala Leu Asp Asp Gln Thr Val Gln Tyr Thr Leu Val Lys Pro Glu
    165                               170
Leu Tyr Trp Asn Ser Lys Thr Leu Ala Thr Ile Leu Phe Pro Val Asn
    180                               185                               190
Ala Asp Phe Leu Lys Ser Lys Gly Asp Asp Phe Gly Lys Ala Asp Pro
    195                               200                               205
Ser Ser Ile Leu Tyr Asn Gly Pro Phe Leu Met Lys Ala Leu Val Ser
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Lys Ser Ala Ile Glu Tyr Lys Lys Asn Pro Asn Tyr Trp Asp Ala Lys
    225                               230                               235                               240
Asn Val Phe Val Asp Asp Val Lys Leu Thr Tyr Tyr Asp Gly Ser Asp
    245                               250                               255
Gln Glu Ser Leu Glu Arg Asn Phe Thr Ala Gly Ala Tyr Thr Thr Ala
    260                               265                               270
Arg Leu Phe Pro Asn Ser Ser Ser Tyr Glu Gly Ile Lys Glu Lys Tyr
    275                               280                               285
Lys Asn Asn Ile Ile Tyr Ser Met Gln Asn Ser Thr Ser Tyr Phe Phe
    290                               295                               300
Asn Phe Asn Leu Asp Arg Lys Ser Tyr Asn Tyr Thr Ser Lys Thr Ser
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Asp Ile Glu Lys Lys Ser Thr Gln Glu Ala Val Leu Asn Lys Asn Phe
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Arg Gln Ala Ile Asn Phe Ala Phe Asp Arg Thr Ser Tyr Gly Ala Gln
    340                               345                               350

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Ser Glu Gly Lys Glu Gly Ala Thr Lys Ile Leu Arg Asn Leu Val Val  
 355 360 365  
 Pro Pro Asn Phe Val Ser Ile Lys Gly Lys Asp Phe Gly Glu Val Val  
 370 375 380  
 Ala Ser Lys Met Val Asn Tyr Gly Lys Glu Trp Gln Gly Ile Asn Phe  
 385 390 395 400  
 Ala Asp Gly Gln Asp Pro Tyr Tyr Asn Pro Glu Lys Ala Lys Ala Lys  
 405 410 415  
 Phe Ala Glu Ala Lys Lys Glu Leu Glu Ala Lys Gly Val Gln Phe Pro  
 420 425 430  
 Ile His Leu Asp Lys Thr Val Glu Val Thr Asp Lys Val Gly Ile Gln  
 435 440 445  
 Gly Val Ser Ser Ile Lys Gln Ser Ile Glu Ser Val Leu Gly Ser Asp  
 450 455 460  
 Asn Val Val Ile Asp Ile Gln Gln Leu Thr Ser Asp Glu Phe Asp Ser  
 465 470 475 480  
 Ser Gly Tyr Phe Ala Gln Thr Ala Ala Gln Lys Asp Tyr Asp Leu Tyr  
 485 490 495  
 His Gly Gly Trp Gly Pro Asp Tyr Gln Asp Pro Ser Thr Tyr Leu Asp  
 500 505 510  
 Ile Phe Asn Thr Asn Ser Gly Gly Phe Leu Gln Asn Leu Gly Leu Glu  
 515 520 525  
 Pro Gly Glu Ala Asn Asp Lys Ala Lys Ala Val Gly Leu Asp Val Tyr  
 530 535 540  
 Thr Gln Met Leu Glu Glu Ala Asn Lys Glu Gln Asp Pro Ala Lys Arg  
 545 550 555 560  
 Tyr Glu Lys Tyr Ala Asp Ile Gln Ala Trp Leu Ile Asp Ser Ser Leu  
 565 570 575  
 Val Leu Pro Ser Val Ser Arg Gly Gly Thr Pro Ser Leu Arg Arg Thr  
 580 585 590  
 Val Pro Phe Ala Ala Ala Tyr Gly Leu Thr Gly Thr Lys Gly Val Glu  
 595 600 605

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Ser Tyr Lys Tyr Leu Lys Val Gln Asp Lys Ile Val Thr Thr Asp Glu  
610 615 620

Tyr Ala Lys Ala Arg Glu Lys Trp Leu Lys Glu Lys Glu Glu Ser Asn  
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Lys Lys Ala Gln Glu Glu Leu Ala Lys His Val Lys  
645 650

<210> 207  
<211> 506  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 207

Val Glu Gln His Ser Asp Val Cys Tyr Ile Phe Tyr Arg Arg Glu Arg  
1 5 10 15

Leu Lys Thr Lys Ile Gly Leu Ala Ser Ile Cys Leu Leu Gly Leu Ala  
20 25 30

Thr Ser His Val Ala Ala Asn Glu Thr Glu Val Ala Lys Thr Ser Gln  
35 40 45

Asp Thr Thr Thr Ala Ser Ser Ser Ser Glu Gln Asn Gln Ser Ser Asn  
50 55 60

Lys Thr Gln Thr Ser Ala Glu Val Gln Thr Asn Ala Ala Ala His Trp  
65 70 75 80

Asp Gly Asp Tyr Tyr Val Lys Asp Asp Gly Ser Lys Ala Gln Ser Glu  
85 90 95

Trp Ile Phe Asp Asn Tyr Tyr Lys Ala Trp Phe Tyr Ile Asn Ser Asp  
100 105 110

Gly Arg Tyr Ser Gln Asn Glu Trp His Gly Asn Tyr Tyr Leu Lys Ser  
115 120 125

Gly Gly Tyr Met Ala Gln Asn Glu Trp Ile Tyr Asp Ser Asn Tyr Lys  
130 135 140

Ser Trp Phe Tyr Leu Lys Ser Asp Gly Ala Tyr Ala His Gln Glu Trp  
145 150 155 160

Gln Leu Ile Gly Asn Lys Trp Tyr Tyr Phe Lys Lys Trp Gly Tyr Met  
165 170 175

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Ala Lys Ser Gln Trp Gln Gly Ser Tyr Phe Leu Asn Gly Gln Gly Ala  
 180 185 190  
 Met Met Gln Asn Glu Trp Leu Tyr Asp Pro Ala Tyr Ser Ala Tyr Phe  
 195 200 205  
 Tyr Leu Lys Ser Asp Gly Thr Tyr Ala Asn Gln Glu Trp Gln Lys Val  
 210 215 220  
 Gly Gly Lys Trp Tyr Tyr Phe Lys Lys Trp Gly Tyr Met Ala Arg Asn  
 225 230 235 240  
 Glu Trp Gln Gly Asn Tyr Tyr Leu Thr Gly Ser Gly Ala Met Ala Thr  
 245 250 255  
 Asp Glu Val Ile Met Asp Gly Thr Arg Tyr Ile Phe Ala Ala Ser Gly  
 260 265 270  
 Glu Leu Lys Glu Lys Lys Asp Leu Asn Val Gly Trp Val His Arg Asp  
 275 280 285  
 Gly Lys Arg Tyr Phe Phe Asn Asn Arg Glu Glu Gln Val Gly Thr Glu  
 290 295 300  
 His Ala Lys Lys Val Ile Asp Ile Ser Glu His Asn Gly Arg Ile Asn  
 305 310 315 320  
 Asp Trp Lys Lys Val Ile Asp Glu Asn Glu Val Asp Gly Val Ile Val  
 325 330 335  
 Arg Leu Gly Tyr Ser Gly Lys Glu Asp Lys Glu Leu Ala His Asn Ile  
 340 345 350  
 Lys Glu Leu Asn Arg Leu Gly Ile Pro Tyr Gly Val Tyr Leu Tyr Thr  
 355 360 365  
 Tyr Ala Glu Asn Glu Thr Asp Ala Glu Ser Asp Ala Lys Gln Thr Ile  
 370 375 380  
 Glu Leu Ile Lys Lys Tyr Asn Met Asn Leu Ser Tyr Pro Ile Tyr Tyr  
 385 390 395 400  
 Asp Val Glu Asn Trp Glu Tyr Val Asn Lys Ser Lys Arg Ala Pro Ser  
 405 410 415  
 Asp Thr Gly Thr Trp Val Lys Ile Ile Asn Lys Tyr Met Asp Thr Met  
 420 425 430

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Lys Gln Ala Gly Tyr Gln Asn Val Tyr Val Tyr Ser Tyr Arg Ser Leu  
435 440 445

Leu Gln Thr Arg Leu Lys His Pro Asp Ile Leu Lys His Val Asn Trp  
450 455 460

Val Ala Ala Tyr Thr Asn Ala Leu Glu Trp Glu Asn Pro His Tyr Ser  
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Gly Lys Lys Gly Trp Gln Tyr Thr Ser Ser Glu Tyr Met Lys Gly Ile  
485 490 495

Gln Gly Arg Val Asp Val Ser Val Trp Tyr  
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<210> 208  
<211> 158  
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<400> 208

Met Ala Lys Glu Pro Trp Gln Glu Asp Ile Tyr Asp Gln Glu Glu Ser  
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Arg Ala Glu Arg Arg His Arg Asn His Gly Gly Ala Asp Arg Met Ala  
20 25 30

Asn Arg Ile Leu Thr Ile Leu Ala Ser Ile Phe Phe Val Ile Val Val  
35 40 45

Val Met Val Ile Val Leu Ile Tyr Leu Ser Ser Gly Gly Ser Asn Arg  
50 55 60

Thr Ala Ala Leu Lys Gly Phe His Asp Ser Asp Ala Ser Val Val Gln  
65 70 75 80

Ile Ser Ser Ser Ser Ser Ser Gln Pro Glu Gln Ser Ser Glu Pro Glu  
85 90 95

Ser Thr Ser Ser Ser Ser Glu Glu Ala Ala Asn Pro Glu Gly Thr Ile  
100 105 110

Lys Val Leu Ala Gly Glu Gly Glu Ala Ala Ile Ala Ala Arg Ala Gly  
115 120 125

Ile Ser Ile Ala Gln Leu Glu Ala Leu Asn Pro Gly His Met Ala Thr  
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Gly Ser Trp Phe Ala Asn Pro Gly Asp Val Ile Lys Ile Lys  
145 150 155

<210> 209  
<211> 262  
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<213> Streptococcus pneumoniae  
<400> 209

Met Pro Ile Thr Ser Leu Glu Ile Lys Asp Lys Thr Phe Gly Thr Arg  
1 5 10 15

Phe Arg Gly Phe Asp Pro Glu Glu Val Asp Glu Phe Leu Asp Ile Val  
20 25 30

Val Arg Asp Tyr Glu Asp Leu Val Arg Ala Asn His Asp Lys Asn Leu  
35 40 45

Arg Ile Lys Ser Leu Glu Glu Arg Leu Ser Tyr Phe Asp Glu Ile Lys  
50 55 60

Asp Ser Leu Ser Gln Ser Val Leu Ile Ala Gln Asp Thr Ala Glu Arg  
65 70 75 80

Val Lys Gln Ala Ala His Glu Arg Ser Asn Asn Ile Ile His Gln Ala  
85 90 95

Glu Gln Asp Ala Gln Arg Leu Leu Glu Glu Ala Lys Tyr Lys Ala Asn  
100 105 110

Glu Ile Leu Arg Gln Ala Thr Asp Asn Ala Lys Lys Val Ala Val Glu  
115 120 125

Thr Glu Glu Leu Lys Asn Lys Ser Arg Val Phe His Gln Arg Leu Lys  
130 135 140

Ser Thr Ile Glu Ser Gln Leu Ala Ile Val Glu Ser Ser Asp Trp Glu  
145 150 155 160

Asp Ile Leu Arg Pro Thr Ala Thr Tyr Leu Gln Thr Ser Asp Glu Ala  
165 170 175

Phe Lys Glu Val Val Ser Glu Val Leu Gly Glu Pro Ile Pro Ala Pro  
180 185 190

Ile Glu Glu Glu Pro Ile Asp Met Thr Arg Gln Phe Ser Gln Ala Glu  
195 200 205

1028462\_1.TXT

Met Ala Glu Leu Gln Ala Arg Ile Glu Val Ala Asp Lys Glu Leu Ser  
210 215 220

Glu Phe Glu Ala Gln Ile Lys Gln Glu Val Glu Ala Pro Thr Pro Val  
225 230 235 240

Val Ser Pro Gln Val Glu Glu Glu Pro Leu Leu Ile Gln Leu Ala Gln  
245 250 255

Cys Met Lys Asn Gln Lys  
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<210> 210  
<211> 179  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 210

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35 40 45

Ser Gln Ser Ala Gly Thr Lys Glu Asn Asn Ile Thr Arg Leu His Ala  
50 55 60

Arg Gln Gln Glu Leu Ala Asn Gln Ser Gln Arg Ala Thr Asp Lys Val  
65 70 75 80

Ile Ile Asp Val Arg Tyr Pro Arg Lys Tyr Glu Asp Ala Thr Glu Ile  
85 90 95

Val Asp Leu Leu Ala Gly Asn Glu Ser Ile Leu Ile Asp Phe Gln Tyr  
100 105 110

Met Thr Glu Val Gln Ala Arg Arg Cys Leu Asp Tyr Leu Asp Gly Ala  
115 120 125

Cys His Val Leu Ala Gly Asn Leu Lys Lys Val Ala Ser Thr Met Tyr  
130 135 140

Leu Leu Thr Pro Val Asn Val Ile Val Asn Val Glu Asp Ile Arg Leu  
145 150 155 160

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Pro Asp Glu Asp Gln Gln Gly Glu Phe Gly Phe Asp Met Lys Arg Asn  
165 170 175

Arg Val Arg

<210> 211  
<211> 305  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 211

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Cys Tyr Asp Asp Gln Gly Glu Val Ser Pro Glu Arg Thr Arg Ala Leu  
20 25 30

Val Gln Tyr Phe Ile Asp Lys Gly Val Gln Gly Leu Tyr Val Asn Gly  
35 40 45

Ser Ser Gly Glu Cys Ile Tyr Gln Ser Val Glu Asp Arg Lys Leu Ile  
50 55 60

Leu Glu Glu Val Met Ala Val Ala Lys Gly Lys Leu Thr Ile Ile Ala  
65 70 75 80

His Val Ala Cys Asn Asn Thr Lys Asp Ser Met Glu Leu Ala Arg His  
85 90 95

Ala Glu Ser Leu Gly Val Asp Ala Ile Ala Thr Ile Pro Pro Ile Tyr  
100 105 110

Phe Arg Leu Pro Glu Tyr Ser Val Ala Lys Tyr Trp Asn Asp Ile Ser  
115 120 125

Ser Ala Ala Pro Asn Thr Asp Tyr Val Ile Tyr Asn Ile Pro Gln Leu  
130 135 140

Ala Gly Val Ala Leu Thr Pro Ser Leu Tyr Thr Glu Met Leu Lys Asn  
145 150 155 160

Pro Arg Val Ile Gly Val Lys Asn Ser Ser Met Pro Val Gln Asp Ile  
165 170 175

Gln Thr Phe Val Ser Leu Gly Gly Glu Asp His Ile Val Phe Asn Gly  
180 185 190

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Pro Asp Glu Gln Phe Leu Gly Gly Arg Leu Met Gly Ala Arg Ala Gly  
195 200 205

Ile Gly Gly Thr Tyr Gly Ala Met Pro Glu Leu Phe Leu Lys Leu Asn  
210 215 220

Gln Leu Ile Ala Asp Lys Asp Leu Glu Thr Ala Arg Glu Leu Gln Tyr  
225 230 235 240

Ala Ile Asn Ala Ile Ile Gly Lys Leu Thr Ser Ala His Gly Asn Met  
245 250 255

Tyr Gly Val Ile Lys Glu Val Leu Lys Ile Asn Glu Gly Leu Asn Ile  
260 265 270

Gly Ser Val Arg Ser Pro Leu Thr Pro Val Thr Glu Glu Asp Arg Pro  
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Val Val Glu Ala Ala Ala Ala Leu Ile Arg Glu Thr Lys Glu Arg Phe  
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Leu  
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<210> 212  
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<212> PRT  
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<400> 212

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1 5 10 15

Ile Ser Leu Leu Met Gly Val Pro Thr Leu Ile His Ala Asn Glu Leu  
20 25 30

Asn Tyr Gly Gln Leu Ser Ile Ser Pro Ile Phe Gln Gly Gly Ser Tyr  
35 40 45

Gln Leu Asn Asn Lys Ser Ile Asp Ile Ser Ser Leu Leu Leu Asp Lys  
50 55 60

Leu Ser Gly Glu Ser Gln Thr Val Val Met Lys Phe Lys Ala Asp Lys  
65 70 75 80

Pro Asn Ser Leu Gln Ala Leu Phe Gly Leu Ser Asn Ser Lys Ala Gly  
85 90 95

1028462\_1.TXT

Phe Lys Asn Asn Tyr Phe Ser Ile Phe Met Arg Asp Ser Gly Glu Ile  
 100 105 110  
 Gly Val Glu Ile Arg Asp Ala Gln Lys Gly Ile Asn Tyr Leu Phe Ser  
 115 120 125  
 Arg Pro Ala Ser Leu Trp Gly Lys His Lys Gly Gln Ala Val Glu Asn  
 130 135 140  
 Thr Leu Val Phe Val Ser Asp Ser Lys Asp Lys Thr Tyr Thr Met Tyr  
 145 150 155 160  
 Val Asn Gly Ile Glu Val Phe Ser Glu Thr Val Asp Thr Phe Leu Pro  
 165 170 175  
 Ile Ser Asn Ile Asn Gly Ile Asp Lys Ala Thr Leu Gly Ala Val Asn  
 180 185 190  
 Arg Glu Gly Lys Glu His Tyr Leu Ala Lys Gly Ser Ile Asp Glu Ile  
 195 200 205  
 Ser Leu Phe Asn Lys Ala Ile Ser Asp Gln Glu Val Ser Thr Ile Pro  
 210 215 220  
 Leu Ser Asn Pro Phe Gln Leu Ile Phe Gln Ser Gly Asp Ser Thr Gln  
 225 230 235 240  
 Ala Asn Tyr Phe Arg Ile Pro Thr Leu Tyr Thr Leu Ser Ser Gly Arg  
 245 250 255  
 Val Leu Ser Ser Ile Asp Ala Arg Tyr Gly Gly Thr His Asp Ser Lys  
 260 265 270  
 Ser Lys Ile Asn Ile Ala Thr Ser Tyr Ser Asp Asp Asn Gly Lys Thr  
 275 280 285  
 Trp Ser Glu Pro Ile Phe Ala Met Lys Phe Asn Asp Tyr Glu Glu Gln  
 290 295 300  
 Leu Val Tyr Trp Pro Arg Asp Asn Lys Leu Lys Asn Ser Gln Ile Ser  
 305 310 315 320  
 Gly Ser Ala Ser Phe Ile Asp Ser Ser Ile Val Glu Asp Lys Lys Ser  
 325 330 335  
 Gly Lys Thr Ile Leu Leu Ala Asp Val Met Pro Ala Gly Ile Gly Asn

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340                                     345                                     350
Asn Asn Ala Asn Lys Ala Asp Ser Gly Phe Lys Glu Ile Asn Gly His
355                                     360                                     365

Tyr Tyr Leu Lys Leu Lys Lys Asn Gly Asp Asn Asp Phe Arg Tyr Thr
370                                     375                                     380

Val Arg Glu Asn Gly Val Val Tyr Asn Glu Thr Thr Asn Lys Pro Thr
385                                     390                                     395

Asn Tyr Thr Ile Asn Asp Lys Tyr Glu Val Leu Glu Gly Gly Lys Ser
405                                     410                                     415

Leu Thr Val Glu Gln Tyr Ser Val Asp Phe Asp Ser Gly Ser Leu Arg
420                                     425                                     430

Glu Arg His Asn Gly Lys Gln Val Pro Met Asn Val Phe Tyr Lys Asp
435                                     440                                     445

Ser Leu Phe Lys Val Thr Pro Thr Asn Tyr Ile Ala Met Thr Thr Ser
450                                     455                                     460

Gln Asn Arg Gly Glu Ser Trp Glu Gln Phe Lys Leu Leu Pro Pro Phe
465                                     470                                     475                                     480

Leu Gly Glu Lys His Asn Gly Thr Tyr Leu Cys Pro Gly Gln Gly Leu
485                                     490                                     495

Ala Leu Lys Ser Ser Asn Arg Leu Ile Phe Ala Thr Tyr Thr Ser Gly
500                                     505                                     510

Glu Leu Thr Tyr Leu Ile Ser Asp Asp Ser Gly Gln Thr Trp Lys Lys
515                                     520                                     525

Ser Ser Ala Ser Ile Pro Phe Lys Asn Ala Thr Ala Glu Ala Gln Met
530                                     535                                     540

Val Glu Leu Arg Asp Gly Val Ile Arg Thr Phe Phe Arg Thr Thr Thr
545                                     550                                     555                                     560

Gly Lys Ile Ala Tyr Met Thr Ser Arg Asp Ser Gly Glu Thr Trp Ser
565                                     570                                     575

Lys Val Ser Tyr Ile Asp Gly Ile Gln Gln Thr Ser Tyr Gly Thr Gln
580                                     585                                     590

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Val Ser Ala Ile Lys Tyr Ser Gln Leu Ile Asp Gly Lys Glu Ala Val  
595 600 605

Ile Leu Ser Thr Pro Asn Ser Arg Ser Gly Arg Lys Gly Gly Gln Leu  
610 615 620

Val Val Gly Leu Val Asn Lys Glu Asp Asp Ser Ile Asp Trp Lys Tyr  
625 630 635 640

His Tyr Asp Ile Asp Leu Pro Ser Tyr Gly Tyr Ala Tyr Ser Ala Ile  
645 650 655

Thr Glu Leu Pro Asn His His Ile Gly Val Leu Phe Glu Lys Tyr Asp  
660 665 670

Ser Trp Ser Arg Asn Glu Leu His Leu Ser Asn Val Val Gln Tyr Ile  
675 680 685

Asp Leu Glu Ile Asn Asp Leu Thr Lys  
690 695

<210> 213  
<211> 946  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 213

Met Asn Arg Ser Val Gln Glu Arg Lys Cys Arg Tyr Ser Ile Arg Lys  
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Leu Ser Val Gly Ala Val Ser Met Ile Val Gly Ala Val Val Phe Gly  
20 25 30

Thr Ser Pro Val Leu Ala Gln Glu Gly Ala Ser Glu Gln Pro Leu Ala  
35 40 45

Asn Glu Thr Gln Leu Ser Gly Glu Ser Ser Thr Leu Thr Asp Thr Glu  
50 55 60

Lys Ser Gln Pro Ser Ser Glu Thr Glu Leu Ser Gly Asn Lys Gln Glu  
65 70 75 80

Gln Glu Arg Lys Asp Lys Gln Glu Glu Lys Ile Pro Arg Asp Tyr Tyr  
85 90 95

Ala Arg Asp Leu Glu Asn Val Glu Thr Val Ile Glu Lys Glu Asp Val  
100 105 110

## 1028462\_1.TXT

Glu Thr Asn Ala Ser Asn Gly Gln Arg Val Asp Leu Ser Ser Glu Leu  
 115 120 125  
 Asp Lys Leu Lys Lys Leu Glu Asn Ala Thr Val His Met Glu Phe Lys  
 130 135 140  
 Pro Asp Ala Lys Ala Pro Ala Phe Tyr Asn Leu Phe Ser Val Ser Ser  
 145 150 155 160  
 Ala Thr Lys Lys Asp Glu Tyr Phe Thr Met Ala Val Tyr Asn Asn Thr  
 165 170 175  
 Ala Thr Leu Glu Gly Arg Gly Ser Asp Gly Lys Gln Phe Tyr Asn Asn  
 180 185 190  
 Tyr Asn Asp Ala Pro Leu Lys Val Lys Pro Gly Gln Trp Asn Ser Val  
 195 200 205  
 Thr Phe Thr Val Glu Lys Pro Thr Ala Glu Leu Pro Lys Gly Arg Val  
 210 215 220  
 Arg Leu Tyr Val Asn Gly Val Leu Ser Arg Thr Ser Leu Arg Ser Gly  
 225 230 235 240  
 Asn Phe Ile Lys Asp Met Pro Asp Val Thr His Val Gln Ile Gly Ala  
 245 250 255  
 Thr Lys Arg Ala Asn Asn Thr Val Trp Gly Ser Asn Leu Gln Ile Arg  
 260 265 270  
 Asn Leu Thr Val Tyr Asn Arg Ala Leu Thr Pro Glu Glu Val Gln Lys  
 275 280 285  
 Arg Ser Gln Leu Phe Lys Arg Ser Asp Leu Glu Lys Lys Leu Pro Glu  
 290 295 300  
 Gly Ala Ala Leu Thr Glu Lys Thr Asp Ile Phe Glu Ser Gly Arg Asn  
 305 310 315 320  
 Gly Asn Pro Asn Lys Asp Gly Ile Lys Ser Tyr Arg Ile Pro Ala Leu  
 325 330 335  
 Leu Lys Thr Asp Lys Gly Thr Leu Ile Ala Gly Ala Asp Glu Arg Arg  
 340 345 350  
 Leu His Ser Ser Asp Trp Gly Asp Ile Gly Met Val Ile Arg Arg Ser  
 355 360 365



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Glu Asp Asn Gly Lys Thr Trp Gly Asp Arg Val Thr Ile Thr Asn Leu  
 370 375 380  
 Arg Asp Asn Pro Lys Ala Ser Asp Pro Ser Ile Gly Ser Pro Val Asn  
 385 390 395 400  
 Ile Asp Met Val Leu Val Gln Asp Pro Glu Thr Lys Arg Ile Phe Ser  
 405 410 415  
 Ile Tyr Asp Met Phe Pro Glu Gly Lys Gly Ile Phe Gly Met Ser Ser  
 420 425 430  
 Gln Lys Glu Glu Ala Tyr Lys Lys Ile Asp Gly Lys Thr Tyr Gln Ile  
 435 440 445  
 Leu Tyr Arg Glu Gly Glu Lys Gly Ala Tyr Thr Ile Arg Glu Asn Gly  
 450 455 460  
 Thr Val Tyr Thr Pro Asp Gly Lys Ala Thr Asp Tyr Arg Val Val Val  
 465 470 475 480  
 Asp Pro Val Lys Pro Ala Tyr Ser Asp Lys Gly Asp Leu Tyr Lys Gly  
 485 490 495  
 Asp Gln Leu Leu Gly Asn Ile Tyr Phe Thr Thr Asn Lys Thr Ser Pro  
 500 505 510  
 Phe Arg Ile Ala Lys Asp Ser Tyr Leu Trp Met Ser Tyr Ser Asp Asp  
 515 520 525  
 Asp Gly Lys Thr Trp Ser Ala Pro Gln Asp Ile Thr Pro Met Val Lys  
 530 535 540  
 Ala Asp Trp Met Lys Phe Leu Gly Val Gly Pro Gly Thr Gly Ile Val  
 545 550 555 560  
 Leu Arg Asn Gly Pro His Lys Gly Arg Ile Leu Ile Pro Val Tyr Thr  
 565 570 575  
 Thr Asn Asn Val Ser His Leu Asp Gly Ser Gln Ser Ser Arg Val Ile  
 580 585 590  
 Tyr Ser Asp Asp His Gly Lys Thr Trp His Ala Gly Glu Ala Val Asn  
 595 600 605  
 Asp Asn Arg Gln Val Asp Gly Gln Lys Ile His Ser Ser Thr Met Asn  
 610 615 620

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Asn Arg Arg Ala Gln Asn Thr Glu Ser Thr Val Val Gln Leu Asn Asn  
 625 630 635 640  
 Gly Asp Val Lys Leu Phe Met Arg Gly Leu Thr Gly Asp Leu Gln Val  
 645 650 655  
 Ala Thr Ser Lys Asp Gly Gly Val Thr Trp Glu Lys Asp Ile Lys Arg  
 660 665 670  
 Tyr Pro Gln Val Lys Asp Val Tyr Val Gln Met Ser Ala Ile His Thr  
 675 680 685  
 Met His Glu Gly Lys Glu Tyr Ile Ile Leu Ser Asn Ala Gly Gly Pro  
 690 695 700  
 Lys Arg Glu Asn Gly Met Val His Leu Ala Arg Val Glu Glu Asn Gly  
 705 710 715 720  
 Glu Leu Thr Trp Leu Lys His Asn Pro Ile Gln Lys Gly Glu Phe Ala  
 725 730 735  
 Tyr Asn Ser Leu Gln Glu Leu Gly Asn Gly Glu Tyr Gly Ile Leu Tyr  
 740 745 750  
 Glu His Thr Glu Lys Gly Gln Asn Ala Tyr Thr Leu Ser Phe Arg Lys  
 755 760 765  
 Phe Asn Trp Glu Phe Leu Ser Lys Asn Leu Ile Ser Pro Thr Glu Ala  
 770 775 780  
 Asn Arg Asp Gly Gln Arg Arg Asp Gly Gln Arg Ser Tyr Trp Leu Gly  
 785 790 795 800  
 Val Arg Leu Arg Ser Ile Gly Gln Gln Gly Ser Asn Pro Ser Ile Gly  
 805 810 815  
 Lys Trp Asn Ser Asp Phe Pro Asn Pro Val Gln Asp Leu Val Val Cys  
 820 825 830  
 Ser Arg Gly Arg Tyr Arg Thr Gly Asn Tyr Trp Tyr Ser Arg Lys His  
 835 840 845  
 Arg Lys Tyr Ala Ser Ser Cys Lys Ser Ser Arg Cys Gln Ser Ser Trp  
 850 855 860  
 Arg Ser Lys Trp Gln Ser Ser Gly Ala Ser Ser Arg Ile Tyr Arg Gly

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875

865 870 875 880

Ser Trp Tyr Arg Ala 885 Ser Cys Ser Asn Arg 890 Arg Val Gly Ile Phe 895 Ala

Cys Asn Ser Tyr 900 Tyr Lys Lys Arg Leu 905 Tyr Leu Gln Ser 910 Ser Ser Cys

Ser Ala Gly 915 Thr Ser Asn Arg Lys 920 Gln Gly Glu Pro Pro 925 Ser Phe Thr

Arg Thr 930 Asn Ser Phe Leu Pro 935 Trp Ser Val Tyr Ala 940 Arg Glu Lys Glu

Arg Thr 945

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<210> 214
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<212> PRT
<213> Streptococcus pneumoniae

<400> 214
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Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
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Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
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Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
Page 295

130

135

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

Leu Ser Tyr Asn Arg Arg Asn Glu Ser Lys Leu Ile Phe Asp Glu Thr  
275 280 285

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
 385 390 395 400  
 Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
 405 410 415  
 Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
 420 425 430  
 Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
 435 440 445  
 Ser Asp Val Ile Ala Glu Leu Lys Glu Lys Lys Val Pro Asp Asn Leu  
 450 455 460  
 Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
 465 470 475 480  
 Leu Lys Gln Ser Leu Pro Glu Gly Thr Thr Tyr Asp Leu Ser Lys Ala  
 485 490 495  
 Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
 500 505 510  
 Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
 515 520 525  
 Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
 530 535 540  
 Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
 545 550 555 560  
 Thr Thr Tyr Asp Val Ser Lys Pro Thr Gln Ile Val Leu Thr Val Ala  
 565 570 575  
 Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
 580 585 590  
 Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
 595 600 605  
 Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
 610 615 620  
 Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
 625 630 635 640

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Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 215  
<211> 311  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 215

Met Thr Lys Leu Ile Phe Met Gly Thr Pro Asp Phe Ser Ala Thr Val  
1 5 10 15

Leu Lys Gly Leu Leu Thr Asp Asp Arg Tyr Glu Ile Leu Ala Val Val  
20 25 30

Thr Gln Pro Asp Arg Ala Val Gly Arg Lys Lys Val Ile Gln Glu Thr  
35 40 45

Pro Val Lys Gln Ala Ala Lys Glu Ala Gly Leu Ser Ile Tyr Gln Pro  
50 55 60

Glu Lys Leu Ser Gly Ser Pro Glu Met Glu Asp Leu Met Lys Leu Gly  
65 70 75 80

Ala Asp Gly Ile Val Thr Ala Ala Phe Gly Gln Phe Leu Pro Ser Lys  
85 90 95

Leu Leu Asp Ser Met Asp Phe Ala Val Asn Val His Ala Ser Leu Leu  
100 105 110

Pro Arg His Arg Gly Gly Ala Pro Ile His Tyr Ala Leu Ile Gln Gly  
115 120 125

Asp Glu Glu Ala Gly Val Thr Ile Met Glu Met Val Lys Glu Met Asp  
130 135 140

Ala Gly Asp Met Ile Ser Arg Arg Ser Ile Pro Ile Thr Asp Glu Asp  
145 150 155 160

Asn Val Gly Thr Leu Phe Glu Lys Leu Ala Leu Val Gly Arg Asp Leu  
165 170 175

Leu Leu Asp Thr Leu Pro Ala Tyr Ile Ala Gly Asp Ile Lys Pro Glu  
180 185 190

1028462\_1.TXT

Pro Gln Asp Thr Ser Gln Val Thr Phe Ser Pro Asn Ile Lys Pro Glu  
195 200 205

Glu Glu Lys Leu Asp Trp Asn Lys Thr Asn Arg Gln Leu Phe Asn Gln  
210 215 220

Ile Arg Gly Met Asn Pro Trp Pro Val Ala His Thr Phe Leu Lys Gly  
225 230 235 240

Asp Arg Phe Lys Ile Tyr Glu Ala Leu Pro Val Glu Gly Gln Gly Asn  
245 250 255

Pro Gly Glu Ile Leu Ser Ile Gly Lys Lys Glu Leu Ile Val Ala Thr  
260 265 270

Ala Glu Gly Ala Leu Ser Leu Lys Gln Val Gln Pro Ala Gly Lys Pro  
275 280 285

Lys Met Asp Ile Ala Ser Phe Leu Asn Gly Val Gly Arg Thr Leu Thr  
290 295 300

Val Gly Glu Arg Phe Gly Asp  
305 310

<210> 216  
<211> 790  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 216

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Ile Leu Lys Gln Ile Asn Ala Leu Lys Gly Lys Met Ser Ser Leu Ser  
20 25 30

Asp Gln Glu Leu Val Ala Lys Thr Val Glu Phe Arg Gln Arg Leu Ser  
35 40 45

Glu Gly Glu Ser Leu Asp Asp Ile Leu Val Glu Ala Phe Ala Val Val  
50 55 60

Arg Glu Ala Asp Lys Arg Ile Leu Gly Met Phe Pro Tyr Asp Val Gln  
65 70 75 80

Val Met Gly Ala Ile Val Met His Tyr Gly Asn Val Ala Glu Met Asn  
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 Asn Ser Asn Leu Gly Phe Asp Tyr Leu Asn Asp Asn Leu Ala Ser Asn  
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Ile Asp Tyr Pro Asp Asn Leu Tyr Ile Thr Leu Pro Glu Lys Val Tyr  
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Ala Ser Leu Glu Tyr Ile Lys Gln Tyr His Ala Lys Gly Asn Pro Leu  
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Leu Val Phe Val Gly Ser Val Glu Met Ser Gln Leu Tyr Ser Ser Leu  
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Leu Phe Arg Glu Gly Ile Ala His Asn Val Leu Asn Ala Asn Asn Ala  
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Ala Arg Glu Ala Gln Ile Ile Ser Glu Ser Gly Gln Met Gly Ala Val  
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Thr Val Ala Thr Ser Met Ala Gly Arg Gly Thr Asp Ile Lys Leu Gly  
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Lys Gly Val Ala Glu Leu Gly Gly Leu Ile Val Ile Gly Thr Glu Arg  
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Met Glu Ser Gln Arg Ile Asp Leu Gln Ile Arg Gly Arg Ser Gly Arg  
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Gln Gly Asp Pro Gly Met Ser Lys Phe Phe Val Ser Leu Glu Asp Asp  
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Val Ile Lys Lys Phe Gly Pro Ser Trp Val His Lys Lys Tyr Lys Asp  
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Tyr Gln Val Gln Asp Met Thr Gln Pro Glu Val Leu Lys Gly Arg Lys  
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Tyr Arg Lys Leu Val Glu Lys Ala Gln His Ala Ser Asp Ser Ala Gly  
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Arg Ser Ala Arg Arg Gln Thr Leu Glu Tyr Ala Glu Ser Met Asn Ile  
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595

600

605

Gln Arg Asp Ile Val Tyr Lys Glu Arg Asn Arg Leu Ile Asp Gly Ser  
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 Page 302

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30

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 Lys Thr Val Glu Lys Thr Asp Ala Leu Ala Thr Asn Asp Thr Val Val  
 50 55 60  
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995 1000 1005

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1010 1015 1020

Ser Ala Ser Glu Ser Ala Ser Thr Ser Ala Ser Ala Ser Ala Ser  
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|      |     |     |     |     |     |      |     |     |     |     |      |      |     |     |
|------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|------|------|-----|-----|
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| 1040 |     |     |     |     |     | 1045 |     |     |     |     | 1050 |      |     |     |
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| Ser  | Ala | Ser | Thr | Ser | Ala | Ser  | Ala | Ser | Ala | Ser | Ile  | Ser  | Ala | Ser |
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| Glu  | Ser | Ala | Ser | Thr | Ser | Ala  | Ser | Ala | Ser | Ala | Ser  | Thr  | Ser | Ala |
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| Thr  | Ser | Ala | Ser | Ala | Ser | Ala  | Ser | Thr | Ser | Ala | Ser  | Ala  | Ser | Ala |
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| Ser  | Thr | Ser | Ala | Ser | Ala | Ser  | Ala | Ser | Thr | Ser | Ala  | Ser  | Ala | Ser |
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1970

1975

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|-----|------|-----|-----|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|
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|     | 2000 |     |     |     |     |     | 2005 |     |     |     | 2010 |     |     |     |
| Ser | Ala  | Ser | Ala | Ser | Ala | Ser | Ile  | Ser | Ala | Ser | Glu  | Ser | Ala | Ser |
|     | 2015 |     |     |     |     |     | 2020 |     |     |     | 2025 |     |     |     |
| Thr | Ser  | Ala | Ser | Ala | Ser | Ala | Ser  | Thr | Ser | Ala | Ser  | Ala | Ser | Ala |
|     | 2030 |     |     |     |     |     | 2035 |     |     |     | 2040 |     |     |     |
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|     | 2060 |     |     |     |     |     | 2065 |     |     |     | 2070 |     |     |     |
| Ser | Ala  | Ser | Thr | Ser | Ala | Ser | Ala  | Ser | Ala | Ser | Thr  | Ser | Ala | Ser |
|     | 2075 |     |     |     |     |     | 2080 |     |     |     | 2085 |     |     |     |
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| Ala | Ser  | Ala | Ser | Ala | Ser | Thr | Ser  | Ala | Ser | Glu | Ser  | Ala | Ser | Thr |
|     | 2120 |     |     |     |     |     | 2125 |     |     |     | 2130 |     |     |     |
| Ser | Ala  | Ser | Ala | Ser | Ala | Ser | Thr  | Ser | Ala | Ser | Ala  | Ser | Ala | Ser |
|     | 2135 |     |     |     |     |     | 2140 |     |     |     | 2145 |     |     |     |
| Thr | Ser  | Ala | Ser | Ala | Ser | Ala | Ser  | Thr | Ser | Ala | Ser  | Ala | Ser | Ala |
|     | 2150 |     |     |     |     |     | 2155 |     |     |     | 2160 |     |     |     |
| Ser | Thr  | Ser | Ala | Ser | Ala | Ser | Ala  | Ser | Thr | Ser | Ala  | Ser | Ala | Ser |
|     | 2165 |     |     |     |     |     | 2170 |     |     |     | 2175 |     |     |     |
| Ala | Ser  | Thr | Ser | Ala | Ser | Ala | Ser  | Thr | Ser | Ala | Ser  | Glu | Ser | Ala |
|     | 2180 |     |     |     |     |     | 2185 |     |     |     | 2190 |     |     |     |
| Ser | Thr  | Ser | Ala | Ser | Ala | Ser | Ala  | Ser | Thr | Ser | Ala  | Ser | Ala | Ser |
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| 2975 |     |     |     |     |     | 2980 |     |     |     |     | 2985 |      |     |     |
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| Ser  | Ala | Ser | Ala | Ser | Thr | Ser  | Ala | Ser | Gly | Ser | Ala  | Ser  | Thr | Ser |
| 3005 |     |     |     |     |     | 3010 |     |     |     |     | 3015 |      |     |     |
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| Ala  | Ser | Thr | Ser | Ala | Ser | Ala  | Ser | Ala | Ser | Thr | Ser  | Ala  | Ser | Ala |
| 3080 |     |     |     |     |     | 3085 |     |     |     |     | 3090 |      |     |     |
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| Ser  | Ala | Ser | Thr | Ser | Ala  | Ser | Ala | Ser | Thr | Ser  |
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| 4040 |     |     |     |     | 4045 |     |     |     |     | 4050 |
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| Ser  | Ala | Ser | Ala | Ser | Ala  | Ser | Thr | Ser | Ala | Ser  |
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Asn Ser Asp Asp Val Thr Ser Gly Val Asn Val Glu Val Gly Lys Thr  
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Gln Val Ala Val Asp Leu Asn Val Ile Val Glu Tyr Gln Lys Asn Val  
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Pro Ala Leu Tyr Ser Glu Ile Arg Glu Ile Val Ser Ser Glu Val Ala  
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Lys Met Thr Asp Leu Glu Ile Val Glu Ile Asn Val Asn Val Val Asp  
115 120 125

Ile Lys Thr Lys Glu Gln His Glu Ala Asp Ser Val Ser Leu Gln Asp  
130 135 140

Arg Val Ser Asp Val Ala Glu Ser Thr Gly Glu Phe Thr Ser Glu Gln  
145 150 155 160

Phe Glu Lys Ala Lys Ser Gly Leu Gly Ser Gly Phe Ser Thr Val Gln  
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Glu Lys Val Ser Glu Gly Val Glu Ala Val Lys Gly Ala Ala Asn Gly  
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Val Val Ser His Glu Asn Thr Arg Val Asn  
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&lt;211&gt; 355

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 219

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Thr Ala Leu Ser Ser His Lys Asp Trp Glu Gln Ile Arg Gly Ala Lys  
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Ile Ala Thr Ile Phe Gln Asp Pro Met Thr Ser Leu Asp Pro Ile Lys  
100 105 110

Thr Ile Gly Ser Gln Ile Thr Glu Val Ile Val Lys His Gln Gly Lys  
115 120 125

Thr Ala Lys Glu Ala Lys Glu Leu Ala Ile Asp Tyr Met Asn Lys Val  
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Gly Ile Pro Asp Ala Asp Arg Arg Phe Asn Glu Tyr Pro Phe Gln Tyr  
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Ser Gly Gly Met Arg Gln Arg Ile Val Ile Ala Ile Ala Leu Ala Cys  
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Arg Pro Asp Val Leu Ile Cys Asp Glu Pro Thr Thr Ala Leu Asp Val  
180 185 190

Thr Ile Gln Ala Gln Ile Ile Asp Leu Leu Lys Ser Leu Gln Asn Glu  
195 200 205

Tyr His Phe Thr Thr Ile Phe Ile Thr His Asp Leu Gly Val Val Ala  
210 215 220

Ser Ile Ala Asp Lys Val Ala Val Met Tyr Ala Gly Glu Ile Val Glu  
225 230 235 240

Tyr Gly Thr Val Glu Glu Val Phe Tyr Asp Pro Arg His Pro Tyr Thr  
245 250 255

Trp Ser Leu Leu Ser Ser Leu Pro Gln Leu Ala Asp Asp Lys Gly Asp



260

265

270

Leu Tyr Ser Ile Pro Gly Thr Pro Pro Ser Leu Tyr Thr Asp Leu Lys  
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Gly Asp Ala Phe Ala Leu Arg Ser Asp Tyr Ala Met Gln Ile Asp Phe  
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Glu Gln Lys Ala Pro Gln Phe Ser Val Ser Glu Thr His Trp Ala Lys  
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Thr Trp Leu Leu His Glu Asp Ala Pro Lys Val Glu Lys Pro Ala Val  
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Asp Tyr Leu Ile Ser Ser Lys Asn Ser Thr Thr Val Val Thr Ser Asn  
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Gly Ile Asp Gly Leu Phe Thr Asn Asp Asn Tyr Gly Asn Leu Ala Pro  
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Ala Val Ala Glu Asp Trp Glu Val Ser Lys Asp Gly Leu Thr Tyr Thr  
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Tyr Lys Ile Arg Lys Gly Val Lys Trp Phe Thr Ser Asp Gly Glu Glu  
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Tyr Ala Glu Val Thr Ala Lys Asp Phe Val Asn Gly Leu Lys His Ala  
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Gly Leu Ala Asp Tyr Leu Ser Gly Thr Ser Thr Asp Phe Ser Thr Val
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Gly Val Lys Ala Val Asp Asp Tyr Thr Leu Gln Tyr Thr Leu Asn Gln
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Pro Glu Pro Phe Trp Asn Ser Lys Leu Thr Tyr Ser Ile Phe Trp Pro
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Leu Thr Ala Lys Ser Ser Val Glu Phe Val Lys Asn Glu Gln Tyr Trp
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Asp Lys Glu Asn Val His Leu Asp Thr Ile Asn Leu Ala Tyr Tyr Asp
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Glu Glu Tyr Lys Asp Asn Ile Tyr Tyr Thr Gln Ser Gly Ser Gly Ile
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Ala Gly Leu Gly Val Asn Ile Asp Arg Gln Ser Tyr Asn Tyr Thr Ser
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Ser Ala Gln Ile Asn Gly Lys Asp Gly Ala Ala Leu Ala Val Arg Asn
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 Val Asn Leu Ala Asp Gly Gln Asp Gly Leu Phe Asn Ala Asp Lys Ala  
 405 410 415  
 Lys Ala Glu Phe Ala Lys Ala Lys Lys Ala Leu Glu Ala Asp Gly Val  
 420 425 430  
 Gln Phe Pro Ile His Leu Asp Val Pro Val Asp Gln Ala Ser Lys Asn  
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 Tyr Ile Ser Arg Ile Gln Ser Phe Lys Gln Ser Val Glu Thr Val Leu  
 450 455 460  
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 465 470 475 480  
 Phe Leu Asn Ile Thr Tyr Tyr Ala Ala Asn Ala Ser Ser Glu Asp Trp  
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 545 550 555 560  
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 580 585 590  
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Leu Gly Phe Phe Ser His Ile Val Gly Asn Gly Cys Ile Met Gln Val  
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Gly Pro Val Asp Asn Gly Ala Trp Asp Val Gly Gly Gly Trp Asn Ala  
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Glu Thr Tyr Ala Ala Val Glu Leu Ile Glu Ser His Ser Thr Lys Glu  
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Glu Phe Met Thr Asp Tyr Arg Leu Tyr Ile Glu Leu Leu Arg Asn Leu  
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Ala Asp Glu Ala Gly Leu Pro Lys Thr Leu Asp Thr Gly Ser Leu Ala  
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Gly Ile Lys Thr His Glu Tyr Cys Thr Asn Asn Gln Pro Asn Asn His  
130 135 140

Ser Asp His Val Asp Pro Tyr Pro Tyr Leu Ala Lys Trp Gly Ile Ser  
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Arg Glu Gln Phe Lys His Asp Ile Glu Asn Gly Leu Thr Ile Glu Thr  
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195 200 205

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210 215 220

Asp Gly Asn Trp Tyr Trp Phe Asp Asn Ser Gly Glu Met Ala Thr Gly  
225 230 235 240

Trp Lys Lys Ile Ala Asp Lys Trp Tyr Tyr Phe Asn Glu Glu Gly Ala  
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Ala Lys Glu Gly Ala Met Val Ser Asn Ala Phe Ile Gln Ser Ala Asp  
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Gly Glu Tyr Glu Asp Gly Thr Asn Asp Phe Glu Thr Phe Leu Lys Tyr  
290 295 300

Lys Lys Ala Ile Asp Tyr Ala Asn Gln Lys Gly Val Ile Ile Val Ala  
305 310 315 320

Ala Leu Gly Asn Asp Ser Leu Asn Val Ser Asn Gln Ser Asp Leu Leu  
325 330 335

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Lys Leu Ile Ser Ser Arg Lys Lys Val Arg Lys Pro Gly Leu Val Val  
340 345 350

Asp Val Pro Ser Tyr Phe Ser Ser Thr Ile Ser Val Gly Gly Ile Asp  
355 360 365

Arg Leu Gly Asn Leu Ser Asp Phe Ser Asn Lys Gly Asp Ser Asp Ala  
370 375 380

Ile Tyr Ala Pro Ala Gly Ser Thr Leu Ser Leu Ser Glu Leu Gly Leu  
385 390 395 400

Asn Asn Phe Ile Asn Ala Glu Lys Tyr Lys Glu Asp Trp Ile Phe Ser  
405 410 415

Ala Thr Leu Gly Gly Tyr Thr Tyr Leu Tyr Gly Asn Ser Phe Ala Ala  
420 425 430

Pro Lys Val Ser Gly Ala Ile Ala Met Ile Ile Asp Lys Tyr Lys Leu  
435 440 445

Lys Asp Gln Pro Tyr Asn Tyr Met Phe Val Lys Lys Phe Trp Lys Lys  
450 455 460

His Tyr Gln  
465

<210> 223  
<211> 308  
<212> PRT  
<213> Streptococcus pneumoniae  
<400> 223

Met Lys Lys Asp Glu Leu Phe Glu Gly Phe Tyr Leu Ile Lys Ser Ala  
1 5 10 15

Asp Leu Arg Gln Thr Arg Ala Gly Lys Asn Tyr Leu Ala Phe Thr Phe  
20 25 30

Gln Asp Asp Ser Gly Glu Ile Asp Gly Lys Leu Trp Asp Ala Gln Pro  
35 40 45

His Asn Ile Glu Ala Phe Thr Ala Gly Lys Val Val His Met Lys Gly  
50 55 60

Arg Arg Glu Val Tyr Asn Asn Thr Pro Gln Val Asn Gln Ile Thr Leu  
65 70 75 80

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Arg Leu Pro Gln Ala Gly Glu Pro Asn Asp Pro Ala Asp Phe Lys Val  
85 90

Lys Ser Pro Val Asp Val Lys Glu Ile Arg Asp Tyr Met Ser Gln Met  
100 105 110

Ile Phe Lys Ile Glu Asn Pro Val Trp Gln Arg Ile Val Arg Asn Leu  
115 120 125

Tyr Thr Lys Tyr Asp Lys Glu Phe Tyr Ser Tyr Pro Ala Ala Lys Thr  
130 135 140

Asn His His Ala Phe Glu Thr Gly Leu Ala Tyr His Thr Ala Thr Met  
145 150 155 160

Val Arg Leu Ala Asp Ala Ile Ser Glu Val Tyr Pro Gln Leu Asn Lys  
165 170 175

Ser Leu Leu Tyr Ala Gly Ile Met Leu His Asp Leu Ala Lys Val Ile  
180 185 190

Glu Leu Thr Gly Pro Asp Gln Thr Glu Tyr Thr Val Arg Gly Asn Leu  
195 200 205

Leu Gly His Ile Ala Leu Ile Asp Ser Glu Ile Thr Lys Thr Val Met  
210 215 220

Glu Leu Gly Ile Asp Asp Thr Lys Glu Glu Val Val Leu Leu Arg His  
225 230 235 240

Val Ile Leu Ser His His Gly Leu Leu Glu Tyr Gly Ser Pro Val Arg  
245 250 255

Pro Arg Ile Met Glu Ala Glu Ile Ile His Met Ile Asp Asn Leu Asp  
260 265 270

Ala Ser Met Met Met Met Ser Thr Ala Leu Ala Leu Val Asp Lys Gly  
275 280 285

Glu Met Thr Asn Lys Ile Phe Ala Met Asp Asn Arg Ser Phe Tyr Lys  
290 295 300

Pro Asp Leu Asp  
305

<210> 224



&lt;211&gt; 221

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 224

Val Thr Ile Leu Gly Lys Asp Thr Val Gln Gln Ser Ala Lys Gly Glu  
 1 5 10 15

Ser Val Thr Gln Glu Ala Thr Pro Glu Tyr Lys Leu Glu Asn Thr Pro  
 20 25 30

Gly Gly Asp Lys Gly Gly Asn Thr Gly Ser Ser Asp Ala Asn Ala Asn  
 35 40 45

Glu Gly Gly Gly Ser Gln Ala Gly Gly Ser Ala His Thr Gly Ser Gln  
 50 55 60

Asn Ser Ala Gln Ser Gln Ala Ser Lys Gln Leu Ala Thr Glu Lys Glu  
 65 70 75 80

Ser Ala Lys Asn Ala Ile Glu Lys Ala Ala Lys Asp Lys Gln Asp Glu  
 85 90 95

Ile Lys Gly Ala Pro Leu Ser Asp Lys Glu Lys Ala Glu Leu Leu Ala  
 100 105 110

Arg Val Glu Ala Glu Lys Gln Ala Ala Leu Lys Glu Ile Glu Asn Ala  
 115 120 125

Lys Thr Met Glu Asp Val Lys Glu Ala Glu Thr Ile Gly Val Gln Ala  
 130 135 140

Ile Ala Met Val Thr Val Pro Lys Arg Pro Val Ala Pro Asn Ala Ala  
 145 150 155 160

Pro Lys Thr Thr Ser Ala Pro Gln Ala Thr Ala Gly Thr Met Gln Asp  
 165 170 175

Val Thr Tyr Gln Ser Pro Ala Gly Lys Gln Leu Pro Asn Thr Gly Ser  
 180 185 190

Ala Ser Ser Ala Ala Leu Ala Ser Leu Gly Leu Val Val Ala Thr Ser  
 195 200 205

Gly Phe Ala Leu Leu Gly Arg Lys Thr Arg Arg Arg Lys  
 210 215 220

&lt;210&gt; 225

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&lt;211&gt; 336

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 225

Met Asn Ala Asp Asp Thr Val Thr Ile Tyr Asp Val Ala Arg Glu Ala  
 1 5 10 15

Gly Val Ser Met Ala Thr Val Ser Arg Val Val Asn Gly Asn Lys Asn  
 20 25 30

Val Lys Glu Asn Thr Arg Lys Lys Val Leu Glu Val Ile Asp Arg Leu  
 35 40 45

Asp Tyr Arg Pro Asn Ala Val Ala Arg Gly Leu Ala Ser Lys Lys Thr  
 50 55 60

Thr Thr Val Gly Val Val Ile Pro Asn Ile Thr Asn Gly Tyr Phe Ser  
 65 70 75 80

Ser Leu Ala Lys Gly Ile Asp Asp Ile Ala Glu Met Tyr Lys Tyr Asn  
 85 90 95

Ile Val Leu Ala Asn Ser Asp Glu Asp Asn Glu Lys Glu Val Ser Val  
 100 105 110

Val Asn Thr Leu Phe Ser Lys Gln Val Asp Gly Ile Ile Tyr Met Gly  
 115 120 125

Tyr His Leu Thr Asp Lys Ile Arg Ser Glu Phe Ser Arg Ser Arg Thr  
 130 135 140

Pro Ile Val Leu Ala Gly Thr Val Asp Val Glu His Gln Leu Pro Ser  
 145 150 155 160

Val Asn Ile Asp Tyr Lys Gln Ala Thr Ile Asp Ala Val Ser Tyr Leu  
 165 170 175

Ala Lys Glu Asn Glu Arg Ile Ala Phe Val Ser Gly Pro Leu Val Asp  
 180 185 190

Asp Ile Asn Gly Lys Val Arg Leu Val Gly Tyr Lys Glu Thr Leu Lys  
 195 200 205

Lys Ala Gly Ile Thr Tyr Ser Glu Gly Leu Val Phe Glu Ser Lys Tyr  
 210 215 220

Ser Tyr Asp Asp Gly Tyr Ala Leu Ala Glu Arg Leu Ile Ser Ser Asn  
 Page 334

225                      230                      235                      240  
 Ala Thr Ala Ala Val Val Thr Gly Asp Glu Leu Ala Ala Gly Val Leu  
                                  245                      250                      255  
 Asn Gly Leu Ala Asp Lys Gly Val Ser Val Pro Glu Asp Phe Glu Ile  
                                  260                      265                      270  
 Ile Thr Ser Asp Asp Ser Gln Ile Ser Arg Phe Thr Arg Pro Asn Leu  
                                  275                      280                      285  
 Thr Thr Ile Ala Gln Pro Leu Tyr Asp Leu Gly Ala Ile Ser Met Arg  
                                  290                      295                      300  
 Met Leu Thr Lys Ile Met His Lys Glu Glu Leu Glu Glu Arg Glu Val  
 305                                   310                      315                      320  
 Leu Leu Pro His Gly Leu Thr Glu Arg Ser Ser Thr Arg Lys Arg Lys  
                                  325                      330                      335

<210> 226  
 <211> 469  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 226

Met Lys Lys Lys Leu Val Phe Pro Asn Leu Phe Trp Trp Gly Ala Ala  
 1                      5                      10                      15  
 Ser Ser Gly Pro Gln Thr Glu Gly Gln Tyr Gly Lys Val His Glu Asn  
                                  20                      25                      30  
 Val Met Asp Tyr Trp Phe Lys Thr His Pro Glu Asp Phe Phe Asp Asn  
                                  35                      40                      45  
 Val Gly Pro Leu Val Ala Ser Asn Phe Phe His Thr Tyr Thr Glu Asp  
                                  50                      55                      60  
 Phe His Leu Met Lys Glu Ile Gly Val Asn Ser Phe Arg Thr Ser Ile  
 65                                   70                      75                      80  
 Gln Trp Ser Arg Leu Ile Lys Asn Leu Glu Thr Gly Glu Pro Asp Pro  
                                  85                      90                      95  
 Lys Gly Ile Ala Phe Tyr Asn Ala Ile Ile Glu Glu Ala Lys Lys Asn  
                                  100                      105                      110  
 Gln Met Asp Leu Val Met Asn Leu His His Phe Asp Leu Pro Val Glu

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115                               120                               125
Leu Leu Gln Lys Tyr Gly Gly Trp Glu Ser Lys His Val Val Glu Leu
   130                               135                               140
Phe Val Lys Phe Ala Lys Thr Ala Phe Thr Cys Phe Gly Asp Lys Val
   145                               150                               155                               160
His Tyr Trp Thr Thr Phe Asn Glu Pro Met Val Ile Pro Glu Ala Gly
   165                               170                               175
Tyr Leu Tyr Ala Phe His Tyr Pro Asn Leu Lys Gly Lys Gly Lys Glu
   180                               185                               190
Ala Val Gln Val Ile Tyr Asn Leu Asn Leu Ala Ser Ala Lys Val Ile
   195                               200                               205
Gln Leu Tyr Arg Ser Leu Glu Leu Asp Gly Lys Ile Gly Ile Ile Leu
   210                               215                               220
Asn Leu Thr Pro Ala Tyr Pro Arg Ser Asn Ser Pro Glu Asp Leu Glu
   225                               230                               235                               240
Ala Ser Arg Phe Thr Asp Asp Phe Phe Asn Lys Val Phe Leu Asn Pro
   245                               250                               255
Ala Val Lys Gly Thr Phe Pro Glu Arg Leu Val Lys Gln Leu Glu Arg
   260                               265                               270
Asp Gly Val Leu Trp Ser His Thr Glu Lys Glu Leu Gln Leu Met Lys
   275                               280                               285
Ser Asn Thr Val Asp Phe Leu Gly Val Asn Tyr Tyr His Pro Lys Arg
   290                               295                               300
Val Gln Ala Gln Ala Asn Pro Glu Glu Tyr Gln Thr Pro Trp Met Pro
   305                               310                               315                               320
Asp Gln Tyr Phe Lys Glu Tyr Glu Trp Leu Glu Arg Arg Met Asn Pro
   325                               330                               335
Tyr Arg Gly Trp Glu Ile Phe Pro Lys Ala Ile Tyr Asp Ile Ala Met
   340                               345                               350
Ile Val Lys Glu Glu Tyr Gly Asn Ile Pro Trp Phe Ile Ser Glu Asn
   355                               360                               365

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Gly Met Gly Val Glu Asn Glu Ala Arg Phe Ile Asp Glu Asn Gly Val  
370 375 380

Ile Asp Asp Val Tyr Arg Ile Glu Phe Tyr Glu Glu His Leu Arg Trp  
385 390 395 400

Leu His Lys Ala Ile Glu Glu Gly Ser His Cys Phe Gly Tyr His Ala  
405 410 415

Trp Thr Ala Phe Asp Cys Trp Ser Trp Asn Asn Ala Tyr Lys Asn Arg  
420 425 430

Tyr Gly Phe Ile Ser Val Asp Leu Glu Thr Gln Lys Arg Thr Ile Lys  
435 440 445

Ser Ser Gly Arg Trp Tyr Arg Lys Val Ser Asp Asn Asn Gly Phe Glu  
450 455 460

Val Glu Ile Glu Glu  
465

<210> 227  
<211> 136  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 227

Val Glu Asn Leu Thr Asn Phe Tyr Glu Lys Tyr Arg Val Tyr Leu Thr  
1 5 10 15

Arg Pro Arg Leu Glu Leu Leu Ala Val Val Thr Ile Val Phe Cys Ala  
20 25 30

Val Leu Val Phe Phe Leu Asn Ile Pro Gly Lys Gly Val Leu Lys Leu  
35 40 45

Asp Asn Gly Thr Ile Val Tyr Asp Gly Ser Leu Val Arg Gly Lys Met  
50 55 60

Asn Gly Gln Gly Thr Ile Thr Phe Gln Asn Gly Asp Gln Tyr Thr Gly  
65 70 75 80

Gly Phe Asn Asn Gly Ala Phe Asn Gly Lys Gly Thr Phe Gln Ser Lys  
85 90 95

Glu Gly Trp Thr Tyr Glu Gly Asp Phe Val Asn Gly Gln Ala Glu Gly  
100 105 110

Lys Gly Lys Leu Thr Thr Glu Gln Glu Val Val Tyr Glu Gly Thr Phe  
 115 120 125

Lys Gln Gly Val Phe Gln Gln Lys  
 130 135

<210> 228

<211> 207

<212> PRT

<213> Streptococcus pneumoniae

<400> 228

Met Leu Asn Lys Ile Arg Asp Tyr Leu Asp Phe Ala Gly Leu Gln Tyr  
 1 5 10 15

Arg Asn Pro Asp Lys Ala Gly Ala Glu Arg Glu Lys Met Leu Ala Phe  
 20 25 30

Arg His Lys Gly Gln Glu Ala Arg Lys Val Phe Thr Glu Leu Ala Lys  
 35 40 45

Ala Phe Gln Ala Ser His Pro Glu Trp Gln Leu Gln Gln Thr Ser Gln  
 50 55 60

Trp Met Asn Gln Ala Gln Arg Leu Arg Pro His Phe Trp Val Tyr Leu  
 65 70 75 80

Gln Arg Asp Gly Gln Val Thr Glu Pro Met Met Ala Leu Arg Leu Tyr  
 85 90 95

Gly Thr Ser Thr Asp Phe Gly Ile Ser Leu Glu Val Ser Phe Ile Glu  
 100 105 110

Arg Lys Lys Asp Glu Gln Thr Leu Gly Lys Gln Ala Lys Val Leu Asp  
 115 120 125

Ile Pro Thr Val Lys Gly Ile Tyr Tyr Leu Thr Tyr Ser Asn Gly Gln  
 130 135 140

Ser Gln Arg Trp Glu Ala Asn Glu Glu Lys Arg Arg Thr Leu Arg Glu  
 145 150 155 160

Lys Val Arg Ser Gln Glu Val Arg Lys Val Leu Val Lys Val Asp Val  
 165 170 175

Pro Met Thr Glu Asn Ser Ser Glu Glu Glu Ile Val Glu Gly Leu Leu  
 180 185 190

Lys Ser Tyr Ser Lys Ile Leu Pro Tyr Tyr Leu Ala Thr Arg Lys  
 195 200 205

<210> 229  
 <211> 152  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 229

Met Val Gln Asn Ser Cys Trp Gln Ser Lys Ser His Lys Val Lys Ala  
 1 5 10 15

Phe Thr Leu Leu Glu Ser Leu Leu Ala Leu Ile Val Ile Ser Gly Gly  
 20 25 30

Leu Leu Leu Phe Gln Ala Met Ser Gln Leu Leu Ile Ser Glu Val Arg  
 35 40 45

Tyr Gln Gln Gln Ser Glu Gln Lys Glu Trp Leu Leu Phe Val Asp Gln  
 50 55 60

Leu Glu Val Glu Leu Asp Arg Ser Gln Phe Glu Lys Val Glu Gly Asn  
 65 70 75 80

Arg Leu Tyr Met Lys Gln Asp Gly Lys Asp Ile Ala Ile Gly Lys Ser  
 85 90 95

Lys Ser Asp Asp Phe Arg Lys Thr Asn Ala Arg Gly Arg Gly Tyr Gln  
 100 105 110

Pro Met Val Tyr Gly Leu Lys Ser Val Arg Ile Thr Glu Asp Asn Gln  
 115 120 125

Leu Val Arg Phe His Phe Gln Phe Gln Lys Gly Leu Glu Arg Glu Phe  
 130 135 140

Ile Tyr Arg Val Glu Lys Glu Lys  
 145 150

<210> 230  
 <211> 108  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 230

Met Lys Lys Met Met Thr Phe Leu Lys Lys Ala Lys Val Lys Ala Phe  
 1 5 10 15

Thr Leu Val Glu Met Leu Val Val Leu Leu Ile Ile Ser Val Leu Phe  
 Page 339

20

25

30

Leu Leu Phe Val Pro Asn Leu Thr Lys Gln Lys Glu Ala Val Asn Asp  
 35 40 45

Lys Gly Lys Ala Ala Val Val Lys Val Val Glu Ser Gln Ala Glu Leu  
 50 55 60

Tyr Ser Leu Glu Lys Asn Glu Asp Ala Ser Leu Arg Lys Leu Gln Ala  
 65 70 75 80

Asp Gly Arg Ile Thr Glu Glu Gln Ala Lys Ala Tyr Lys Glu Tyr Asn  
 85 90 95

Asp Lys Asn Gly Gly Ala Asn Arg Lys Val Asn Asp  
 100 105

<210> 231  
 <211> 299  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 231

Met Thr Ser Lys Val Arg Lys Ala Val Ile Pro Ala Ala Gly Leu Gly  
 1 5 10 15

Thr Arg Phe Leu Pro Ala Thr Lys Ala Leu Ala Lys Glu Met Leu Pro  
 20 25 30

Ile Val Asp Lys Pro Thr Ile Gln Phe Ile Val Glu Glu Ala Leu Lys  
 35 40 45

Ser Gly Ile Glu Asp Ile Leu Val Val Thr Gly Lys Ser Lys Arg Ser  
 50 55 60

Ile Glu Asp His Phe Asp Ser Asn Phe Glu Leu Glu Tyr Asn Leu Lys  
 65 70 75 80

Glu Lys Gly Lys Thr Asp Leu Leu Lys Leu Val Asp Lys Thr Thr Asp  
 85 90 95

Met Arg Leu His Phe Ile Arg Gln Thr His Pro Arg Gly Leu Gly Asp  
 100 105 110

Ala Val Leu Gln Ala Lys Ala Phe Val Gly Asn Glu Pro Phe Val Val  
 115 120 125

Met Leu Gly Asp Asp Leu Met Asp Ile Thr Asp Glu Lys Ala Val Pro  
 Page 340



130

135

Leu Thr Lys Gln Leu Met Asp Asp Tyr Glu Arg Thr His Ala Ser Thr  
145 150 155 160

Ile Ala Val Met Pro Val Pro His Asp Glu Val Ser Ala Tyr Gly Val  
165 170 175

Ile Ala Pro Gln Gly Glu Gly Lys Asp Gly Leu Tyr Ser Val Glu Thr  
180 185 190

Phe Val Glu Lys Pro Ala Pro Glu Asp Ala Pro Ser Asp Leu Ala Ile  
195 200 205

Ile Gly Arg Tyr Leu Leu Thr Pro Glu Ile Phe Glu Ile Leu Glu Lys  
210 215 220

Gln Ala Pro Gly Ala Gly Asn Glu Ile Gln Leu Thr Asp Ala Ile Asp  
225 230 235 240

Thr Leu Asn Lys Thr Gln Arg Val Phe Ala Arg Glu Phe Lys Gly Ala  
245 250 255

Arg Tyr Asp Val Gly Asp Lys Phe Gly Phe Met Lys Thr Ser Ile Asp  
260 265 270

Tyr Ala Leu Lys His Pro Gln Val Lys Asp Asp Leu Lys Asn Tyr Leu  
275 280 285

Ile Gln Leu Gly Lys Glu Leu Thr Glu Lys Glu  
290 295

<210> 232  
<211> 821  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 232

Met Gln Asn Gln Leu Asn Glu Leu Lys Arg Lys Met Leu Glu Phe Phe  
1 5 10 15

Gln Gln Lys Gln Lys Asn Lys Lys Ser Ala Arg Pro Gly Lys Lys Gly  
20 25 30

Ser Ser Thr Lys Lys Ser Lys Thr Leu Asp Lys Ser Val Ile Phe Pro  
35 40 45

Ala Ile Leu Leu Ser Ile Lys Ala Leu Phe Asn Leu Leu Phe Val Leu  
Page 341

50

55

Gly Phe Leu Gly Gly Met Leu Gly Ala Gly Ile Ala Leu Gly Tyr Gly  
65 70 75 80  
Val Ala Leu Phe Asp Lys Val Arg Val Pro Gln Thr Glu Glu Leu Val  
85 90 95  
Asn Gln Val Lys Asp Ile Ser Ser Ile Ser Glu Ile Thr Tyr Ser Asp  
100 105 110  
Gly Thr Val Ile Ala Ser Ile Glu Ser Asp Leu Leu Arg Thr Ser Ile  
115 120 125  
Ser Ser Glu Gln Ile Ser Glu Asn Leu Lys Lys Ala Ile Ile Ala Thr  
130 135 140  
Glu Asp Glu His Phe Lys Glu His Lys Gly Val Val Pro Lys Ala Val  
145 150 155 160  
Ile Arg Ala Thr Leu Gly Lys Phe Val Gly Leu Gly Ser Ser Ser Gly  
165 170 175  
Gly Ser Thr Leu Thr Gln Gln Leu Ile Lys Gln Gln Val Val Gly Asp  
180 185 190  
Ala Pro Thr Leu Ala Arg Lys Ala Ala Glu Ile Val Asp Ala Leu Ala  
195 200 205  
Leu Glu Arg Ala Met Asn Lys Asp Glu Ile Leu Thr Thr Tyr Leu Asn  
210 215 220  
Val Ala Pro Phe Gly Arg Asn Asn Lys Gly Gln Asn Ile Ala Gly Ala  
225 230 235 240  
Arg Gln Ala Ala Glu Gly Ile Phe Gly Val Asp Ala Ser Gln Leu Thr  
245 250 255  
Val Pro Gln Ala Ala Phe Leu Ala Gly Leu Pro Gln Ser Pro Ile Thr  
260 265 270  
Tyr Ser Pro Tyr Glu Asn Thr Gly Glu Leu Lys Ser Asp Glu Asp Leu  
275 280 285  
Glu Ile Gly Leu Arg Arg Ala Lys Ala Val Leu Tyr Ser Met Tyr Arg  
290 295 300

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Thr Gly Ala Leu Ser Lys Asp Glu Tyr Ser Gln Tyr Lys Asp Tyr Asp  
 305 310 315 320  
 Leu Lys Gln Asp Phe Leu Pro Ser Gly Thr Val Thr Gly Ile Ser Arg  
 325 330 335  
 Asp Tyr Leu Tyr Phe Thr Thr Leu Ala Glu Ala Gln Glu Arg Met Tyr  
 340 345 350  
 Asp Tyr Leu Ala Gln Arg Asp Asn Val Ser Ala Lys Glu Leu Lys Asn  
 355 360 365  
 Glu Ala Thr Gln Lys Phe Tyr Arg Asp Leu Ala Ala Lys Glu Ile Glu  
 370 375 380  
 Asn Gly Gly Tyr Lys Ile Thr Thr Thr Ile Asp Gln Lys Ile His Ser  
 385 390 395 400  
 Ala Met Gln Ser Ala Val Ala Asp Tyr Gly Tyr Leu Leu Asp Asp Gly  
 405 410 415  
 Thr Gly Arg Val Glu Val Gly Asn Val Leu Met Asp Asn Gln Thr Gly  
 420 425 430  
 Ala Ile Leu Gly Phe Val Gly Gly Arg Asn Tyr Gln Glu Asn Gln Asn  
 435 440 445  
 Asn His Ala Phe Asp Thr Lys Arg Ser Pro Ala Ser Thr Thr Lys Pro  
 450 455 460  
 Leu Leu Ala Tyr Gly Ile Ala Ile Asp Gln Gly Leu Met Gly Ser Glu  
 465 470 475 480  
 Thr Ile Leu Ser Asn Tyr Pro Thr Asn Phe Ala Asn Gly Asn Pro Ile  
 485 490 495  
 Met Tyr Ala Asn Ser Lys Gly Thr Gly Met Met Thr Leu Gly Glu Ala  
 500 505 510  
 Leu Asn Tyr Ser Trp Asn Ile Pro Ala Tyr Trp Thr Tyr Arg Met Leu  
 515 520 525  
 Arg Glu Lys Gly Val Asp Val Lys Gly Tyr Met Glu Lys Met Gly Tyr  
 530 535 540  
 Glu Ile Pro Glu Tyr Gly Ile Glu Ser Leu Pro Met Gly Gly Gly Ile  
 545 550 555 560

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Glu Val Thr Val Ala Gln His Thr Asn Gly Tyr Gln Thr Leu Ala Asn  
 565 570 575  
 Asn Gly Val Tyr His Gln Lys His Val Ile Ser Lys Ile Glu Ala Ala  
 580 585 590  
 Asp Gly Arg Val Val Tyr Glu Tyr Gln Asp Lys Pro Val Gln Val Tyr  
 595 600 605  
 Ser Lys Ala Thr Ala Thr Ile Met Gln Gly Leu Leu Arg Glu Val Leu  
 610 615 620  
 Ser Ser Arg Val Thr Thr Thr Phe Lys Ser Asn Leu Thr Ser Leu Asn  
 625 630 635 640  
 Pro Thr Leu Ala Asn Ala Asp Trp Ile Gly Lys Thr Gly Thr Thr Asn  
 645 650 655  
 Gln Asp Glu Asn Met Trp Leu Met Leu Ser Thr Pro Arg Leu Thr Leu  
 660 665 670  
 Gly Gly Trp Ile Gly His Asp Asp Asn His Ser Leu Ser Arg Arg Ala  
 675 680 685  
 Gly Tyr Ser Asn Asn Ser Asn Tyr Met Ala His Leu Val Asn Ala Ile  
 690 695 700  
 Gln Gln Ala Ser Pro Ser Ile Trp Gly Asn Glu Arg Phe Ala Leu Asp  
 705 710 715 720  
 Pro Ser Val Val Lys Ser Glu Val Leu Lys Ser Thr Gly Gln Lys Pro  
 725 730 735  
 Glu Lys Val Ser Val Glu Gly Lys Glu Val Glu Val Thr Gly Ser Thr  
 740 745 750  
 Val Thr Ser Tyr Trp Ala Asn Lys Ser Gly Ala Pro Ala Thr Ser Tyr  
 755 760 765  
 Arg Phe Ala Ile Gly Gly Ser Asp Ala Asp Tyr Gln Asn Ala Trp Ser  
 770 775 780  
 Ser Ile Val Gly Ser Leu Pro Thr Pro Ser Ser Ser Ser Ser Ser  
 785 790 795 800  
 Ser Ser Ser Ser Asp Ser Ser Asn Ser Ser Thr Thr Arg Pro Ser Ser  
 805 810 815

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Ser Arg Ala Arg Arg  
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<210> 233  
<211> 423  
<212> PRT  
<213> Streptococcus pneumoniae  
<400> 233

Met Ser Ser Lys Phe Met Lys Ser Ala Ala Val Leu Gly Thr Ala Thr  
1 5 10 15

Leu Ala Ser Leu Leu Val Ala Cys Gly Ser Lys Thr Ala Asp Lys  
20 25 30

Pro Ala Asp Ser Gly Ser Ser Glu Val Lys Glu Leu Thr Val Tyr Val  
35 40 45

Asp Glu Gly Tyr Lys Ser Tyr Ile Glu Glu Val Ala Lys Ala Tyr Glu  
50 55 60

Lys Glu Ala Gly Val Lys Val Thr Leu Lys Thr Gly Asp Ala Leu Gly  
65 70 75 80

Gly Leu Asp Lys Leu Ser Leu Asp Asn Gln Ser Gly Asn Val Pro Asp  
85 90 95

Val Met Met Ala Pro Tyr Asp Arg Val Gly Ser Leu Gly Ser Asp Gly  
100 105 110

Gln Leu Ser Glu Val Lys Leu Ser Asp Gly Ala Lys Thr Asp Asp Thr  
115 120 125

Thr Lys Ser Leu Val Thr Ala Ala Asn Gly Lys Val Tyr Gly Ala Pro  
130 135 140

Ala Val Ile Glu Ser Leu Val Met Tyr Tyr Asn Lys Asp Leu Val Lys  
145 150 155 160

Asp Ala Pro Lys Thr Phe Ala Asp Leu Glu Asn Leu Ala Lys Asp Ser  
165 170 175

Lys Tyr Ala Phe Ala Gly Glu Asp Gly Lys Thr Thr Ala Phe Leu Ala  
180 185 190

Asp Trp Thr Asn Phe Tyr Tyr Thr Tyr Gly Leu Leu Ala Gly Asn Gly  
195 200 205

1028462\_1.TXT

Ala Tyr Val Phe Gly Gln Asn Gly Lys Asp Ala Lys Asp Ile Gly Leu  
210 215 220

Ala Asn Asp Gly Ser Ile Val Gly Ile Asn Tyr Ala Lys Ser Trp Tyr  
225 230 235 240

Glu Lys Trp Pro Lys Gly Met Gln Asp Thr Glu Gly Ala Gly Asn Leu  
245 250 255

Ile Gln Thr Gln Phe Gln Glu Gly Lys Thr Ala Ala Ile Ile Asp Gly  
260 265 270

Pro Trp Lys Ala Gln Ala Phe Lys Asp Ala Lys Val Asn Tyr Gly Val  
275 280 285

Ala Thr Ile Pro Thr Leu Pro Asn Gly Lys Glu Tyr Ala Ala Phe Gly  
290 295 300

Gly Gly Lys Ala Trp Val Ile Pro Gln Ala Val Lys Asn Leu Glu Ala  
305 310 315 320

Ser Gln Lys Phe Val Asp Phe Leu Val Ala Thr Glu Gln Gln Lys Val  
325 330 335

Leu Tyr Asp Lys Thr Asn Glu Ile Pro Ala Asn Thr Glu Ala Arg Ser  
340 345 350

Tyr Ala Glu Gly Lys Asn Asp Glu Leu Thr Thr Ala Val Ile Lys Gln  
355 360 365

Phe Lys Asn Thr Gln Pro Leu Pro Asn Ile Ser Gln Met Ser Ala Val  
370 375 380

Trp Asp Pro Ala Lys Asn Met Leu Phe Asp Ala Val Ser Gly Gln Lys  
385 390 395 400

Asp Ala Lys Thr Ala Ala Asn Asp Ala Val Thr Leu Ile Lys Glu Thr  
405 410 415

Ile Lys Gln Lys Phe Gly Glu  
420

<210> 234  
<211> 155  
<212> PRT  
<213> Streptococcus pneumoniae

&lt;400&gt; 234

Met Ile Asp Lys Val Val Arg Asn Leu Leu Leu Thr Phe Phe Phe Cys  
1 5 10 15

Lys Met Thr Lys Ile Ile Ile Phe Leu Thr Thr Ile Leu Val Lys Lys  
20 25 30

Lys Lys Ile Cys Tyr Asn Glu Phe Lys Leu Arg Asn Arg Lys Gln Lys  
35 40 45

Gly Val Ile Met Trp Val Leu Gly Phe Ile Leu Phe Met Ile Phe Phe  
50 55 60

Tyr Ser Asn Asn Ser Lys Lys Ile Lys Lys Leu Glu Asn Lys Ile Lys  
65 70 75 80

Arg Leu Glu Arg Lys Glu Lys Gly Asn Ala Glu Met Ser Arg Leu Leu  
85 90 95

Gln Glu Met Ile Gly Lys Glu Pro Ile Ile Thr Gly Val Tyr Ile Gly  
100 105 110

Pro Asp Asn Trp Glu Val Val Asp Val Asp Glu Glu Trp Val Lys Leu  
115 120 125

Arg Arg Val Asp Asn Thr Gly Lys Glu Lys Phe Lys Leu Gln Arg Ile  
130 135 140

Glu Asp Ile Gln Thr Val Glu Phe Asp Gly Glu  
145 150 155

&lt;210&gt; 235

&lt;211&gt; 285

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 235

Met Ile Leu Ser Lys Asn Arg Glu Asp Gly Leu Arg Lys Phe Ala Thr  
1 5 10 15

Asn Ile Arg Leu Asn Thr Leu Arg Thr Leu Asn His Leu Gly Phe Gly  
20 25 30

His Tyr Gly Gly Ser Leu Ser Ile Val Glu Val Leu Ala Val Leu Tyr  
35 40 45

Gly Glu Ile Met Pro Met Thr Pro Glu Ile Phe Ala Ala Arg Asp Arg  
50 55 60

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Asp Tyr Phe Ile Leu Ser Lys Gly His Gly Gly Pro Ala Leu Tyr Ser  
65 70 75 80

Thr Leu Tyr Leu Asn Gly Phe Phe Asp Lys Glu Phe Leu Tyr Ser Leu  
85 90 95

Asn Thr Asn Gly Thr Lys Leu Pro Ser His Pro Asp Arg Asn Leu Thr  
100 105 110

Pro Gly Ile Asp Met Thr Thr Gly Ser Leu Gly Gln Gly Ile Ser Val  
115 120 125

Ala Thr Gly Leu Ala Tyr Gly Gln Arg Ile Arg Lys Ser Pro Phe Tyr  
130 135 140

Thr Tyr Ala Ile Val Gly Asp Gly Glu Leu Asn Glu Gly Gln Cys Trp  
145 150 155 160

Glu Ala Ile Gln Phe Ala Ser His Gln Gln Leu Ser Asn Leu Ile Val  
165 170 175

Phe Val Asp Asp Asn Lys Lys Gln Leu Asp Gly Phe Thr Lys Asp Ile  
180 185 190

Cys Asn Pro Gly Asp Phe Val Glu Lys Phe Ser Ala Phe Gly Phe Glu  
195 200 205

Ser Ile Arg Val Lys Gly Ser Asp Ile Arg Glu Ile Tyr Glu Gly Ile  
210 215 220

Val Gln Leu Lys Gln Ser Asn Asn Ser Ser Pro Lys Cys Ile Val Leu  
225 230 235 240

Asp Thr Ile Lys Gly Gln Gly Val Gln Glu Leu Glu Glu Met Lys Ser  
245 250 255

Asn His His Leu Arg Pro Thr Val Glu Glu Lys Gln Met Leu Thr Ser  
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Val Val Glu Arg Leu Ser Gln Glu Leu Glu Glu Thr Glu  
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<210> 236  
<211> 621  
<212> PRT  
<213> Streptococcus pneumoniae



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35 40 45

Ile Lys Tyr Lys Val Leu Thr Val Glu Gly Asn Ile Gly Thr Val Gln  
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Val Gly Asn Gly Val Thr Pro Val Glu Phe Glu Ala Gly Gln Asp Gly  
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Lys Pro Phe Thr Ile Pro Thr Lys Ile Thr Val Gly Asp Lys Val Phe  
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Thr Val Thr Glu Val Ala Ser Gln Ala Phe Ser Tyr Tyr Pro Asp Glu  
100 105 110

Thr Gly Arg Ile Val Tyr Tyr Pro Ser Ser Ile Thr Ile Pro Ser Ser  
115 120 125

Ile Lys Lys Ile Gln Lys Lys Gly Phe His Gly Ser Lys Ala Lys Thr  
130 135 140

Ile Ile Phe Asp Lys Gly Ser Gln Leu Glu Lys Ile Glu Asp Arg Ala  
145 150 155 160

Phe Asp Phe Ser Glu Leu Glu Glu Ile Glu Leu Pro Ala Ser Leu Glu  
165 170 175

Tyr Ile Gly Thr Ser Ala Phe Ser Phe Ser Gln Lys Leu Lys Lys Leu  
180 185 190

Thr Phe Ser Ser Ser Ser Lys Leu Glu Leu Ile Ser His Glu Ala Phe  
195 200 205

Ala Asn Leu Ser Asn Leu Glu Lys Leu Thr Leu Pro Lys Ser Val Lys  
210 215 220

Thr Leu Gly Ser Asn Leu Phe Arg Leu Thr Thr Ser Leu Lys His Val  
225 230 235 240

Asp Val Glu Glu Gly Asn Glu Ser Phe Ala Ser Val Asp Gly Val Leu  
Page 349

Phe Ser Lys Asp Lys Thr Gln Leu Ile Tyr Tyr Pro Ser Gln Lys Asn  
260 265 270

Asp Glu Ser Tyr Lys Thr Pro Lys Glu Thr Lys Glu Leu Ala Ser Tyr  
275 280 285

Ser Phe Asn Lys Asn Ser Tyr Leu Lys Lys Leu Glu Leu Asn Glu Gly  
290 295 300

Leu Glu Lys Ile Gly Thr Phe Ala Phe Ala Asp Ala Ile Lys Leu Glu  
305 310 315 320

Glu Ile Ser Leu Pro Asn Ser Leu Glu Thr Ile Glu Arg Leu Ala Phe  
325 330 335

Tyr Gly Asn Leu Glu Leu Lys Glu Leu Ile Leu Pro Asp Asn Val Lys  
340 345 350

Asn Phe Gly Lys His Val Met Asn Gly Leu Pro Lys Leu Lys Ser Leu  
355 360 365

Thr Ile Gly Asn Asn Ile Asn Ser Leu Pro Ser Phe Phe Leu Ser Gly  
370 375 380

Val Leu Asp Ser Leu Lys Glu Ile His Ile Lys Asn Lys Ser Thr Glu  
385 390 395 400

Phe Ser Val Lys Lys Asp Thr Phe Ala Ile Pro Glu Thr Val Lys Phe  
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Tyr Val Thr Ser Glu His Ile Lys Asp Val Leu Lys Ser Asn Leu Ser  
420 425 430

Thr Ser Asn Asp Ile Ile Val Glu Lys Val Asp Asn Ile Lys Gln Glu  
435 440 445

Thr Asp Val Ala Lys Pro Lys Lys Asn Ser Asn Gln Gly Val Val Gly  
450 455 460

Trp Val Lys Asp Lys Gly Leu Trp Tyr Tyr Leu Asn Glu Ser Gly Ser  
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Met Ala Thr Gly Trp Val Lys Asp Lys Gly Leu Trp Tyr Tyr Leu Asn  
485 490 495

Glu Ser Gly Ser Met Ala Thr Gly Trp Val Lys Asp Lys Gly Leu Trp  
 500 505 510

Tyr Tyr Leu Asn Glu Ser Gly Ser Met Ala Thr Gly Trp Val Lys Asp  
 515 520 525

Lys Gly Leu Trp Tyr Tyr Leu Asn Glu Ser Gly Ser Met Ala Thr Gly  
 530 535 540

Trp Val Lys Asp Lys Gly Leu Trp Tyr Tyr Leu Asn Glu Ser Gly Ser  
 545 550 555 560

Met Ala Thr Gly Trp Val Lys Asp Lys Gly Leu Trp Tyr Tyr Leu Asn  
 565 570 575

Glu Ser Gly Ser Met Ala Thr Gly Trp Val Thr Val Ser Gly Lys Trp  
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Asp Gly Tyr Arg Val Asn Ala Asn Gly Glu Trp Val Gly  
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<210> 237  
 <211> 626  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 237

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Gln Leu Thr Tyr Arg Lys Pro His Gln Leu Tyr Arg Ala Leu Ser Leu  
 50 55 60

Leu Val Thr Val Leu Ala Glu Ala Asp Lys Val Glu Ile Glu Glu Gln  
 65 70 75 80

Ala Ala Tyr Glu Asp Leu Ala Tyr Met Val Asp Cys Ser Arg Asn Ala  
 85 90 95

Val Leu Asn Val Ala Ser Ala Lys Gln Met Ile Glu Ile Leu Ala Leu  
 100 105 110  
 Met Gly Tyr Ser Thr Phe Glu Leu Tyr Met Glu Asp Thr Tyr Gln Ile  
 115 120 125  
 Glu Gly Gln Pro Tyr Phe Gly Tyr Phe Arg Gly Ala Tyr Ser Ala Glu  
 130 135 140  
 Glu Leu Gln Glu Ile Glu Ala Tyr Ala Gln Gln Phe Asp Val Thr Phe  
 145 150 155 160  
 Val Pro Cys Ile Gln Thr Leu Ala His Leu Ser Ala Phe Val Lys Trp  
 165 170 175  
 Gly Val Lys Glu Val Gln Glu Leu Arg Asp Val Glu Asp Ile Leu Leu  
 180 185 190  
 Ile Gly Glu Glu Lys Val Tyr Asp Leu Ile Asp Gly Met Phe Ala Thr  
 195 200 205  
 Leu Ser Lys Leu Lys Thr Arg Lys Val Asn Ile Gly Met Asp Glu Ala  
 210 215 220  
 His Leu Val Gly Leu Gly Arg Tyr Leu Ile Leu Asn Gly Val Val Asp  
 225 230 235 240  
 Arg Ser Leu Leu Met Cys Gln His Leu Glu Arg Val Leu Asp Ile Ala  
 245 250 255  
 Asp Lys Tyr Gly Phe His Cys Gln Met Trp Ser Asp Met Phe Phe Lys  
 260 265 270  
 Leu Met Ser Ala Asp Gly Gln Tyr Asp Arg Asp Val Glu Ile Pro Glu  
 275 280 285  
 Glu Thr Arg Val Tyr Leu Asp Arg Leu Lys Asp Arg Val Thr Leu Val  
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 Tyr Trp Asp Tyr Tyr Gln Asp Ser Glu Glu Lys Tyr Asn Arg Asn Phe  
 305 310 315 320  
 Arg Asn His His Lys Ile Ser His Asp Leu Ala Phe Ala Gly Gly Ala  
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 340 345 350

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 385 390 395 400  
 Leu Asp Gly Leu Ser Ala His Phe Lys Thr Asn Thr Gly Leu Thr Val  
 405 410 415  
 Glu Asp Phe Met Gln Ile Asp Leu Ala Asn Leu Leu Pro Asp Leu Pro  
 420 425 430  
 Gly Asn Leu Ser Gly Ile Asn Pro Asn Arg Tyr Val Phe Tyr Gln Asp  
 435 440 445  
 Ile Leu Cys Pro Ile Leu Asp Gln His Met Thr Pro Glu Gln Asp Lys  
 450 455 460  
 Pro His Phe Ala Gln Ala Ala Glu Thr Leu Ala Asn Ile Lys Glu Lys  
 465 470 475 480  
 Ala Gly Asn Tyr Ala Tyr Leu Phe Glu Thr Gln Ala Gln Leu Asn Ala  
 485 490 495  
 Ile Leu Ser Ser Lys Val Asp Val Gly Arg Arg Ile Arg Gln Ala Tyr  
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 515 520 525  
 Pro Glu Leu Arg Ser Gln Ile Glu Asp Phe His Ala Leu Phe Ser His  
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 Gln Trp Leu Lys Glu Asn Lys Val Phe Gly Leu Asp Thr Val Asp Ile  
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 Arg Met Gly Gly Leu Leu Gln Arg Ile Lys Arg Ala Glu Ser Arg Ile  
 565 570 575  
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 Glu Ile Leu Pro Phe Thr Asp Phe Tyr Ala Asp Lys Asp Phe Ala Ala  
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Thr Thr  
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<210> 238  
<211> 782  
<212> PRT  
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<400> 238

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Ile Ser Lys Ser Val Ile Ala Thr Ser Leu Val Pro Ile Leu Ile Gly  
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Leu Ala Leu Asn Arg Val Leu Ser Leu Ser Gln Phe Gly Lys Thr Ile  
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Leu Leu Ala Ile Leu Val Gly Met Phe Thr Val Met Gln Ser Val Ala  
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Pro Leu Val Thr Tyr Leu Phe Val Val Ala Ile Ser Ile Leu Asp Gly  
100 105 110

Phe Ala Ala Pro Val Ser Tyr Ala Ile Val Pro Arg Tyr Ala Thr Asp  
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Leu Gly Lys Ala Asn Ser Ala Leu Ser Met Thr Gly Glu Ala Val Gln  
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Leu Ile Gly Trp Gly Leu Gly Gly Leu Leu Phe Ala Thr Ile Gly Leu  
145 150 155 160

Leu Pro Thr Thr Cys Ile Asn Leu Val Leu Tyr Ile Ile Ser Ser Phe  
165 170 175

Leu Met Leu Phe Leu Pro Asn Ala Glu Val Glu Val Leu Glu Ser Glu  
180 185 190

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Thr Asn Leu Glu Ile Leu Leu Lys Gly Trp Lys Leu Val Ala Arg Asn  
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Pro Arg Leu Arg Leu Phe Val Ser Ala Asn Leu Leu Glu Ile Phe Ser  
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Asn Thr Ile Trp Val Ser Ser Ile Ile Leu Val Phe Val Thr Glu Leu  
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Leu Asn Lys Thr Glu Ser Tyr Trp Gly Tyr Ser Asn Thr Ala Tyr Ser  
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Ile Gly Ile Ile Ile Ser Gly Leu Ile Ala Phe Arg Leu Ser Glu Lys  
260 265 270

Phe Leu Ala Ala Lys Trp Glu Pro Gln Leu Phe Thr Pro Asn Leu Lys  
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Thr Ile Gln Asn Pro Cys Leu Ser Leu Asp Pro Gly Trp Phe Leu Phe  
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Ser Pro Asn Gly Cys Phe Leu Leu Asp Lys Lys Glu Phe Pro Leu Tyr  
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Gly Ile Ser Val Glu Lys Asn Thr Lys Arg Lys Glu Thr His Met Asn  
325 330 335

Ser Leu Pro Asn His His Phe Gln Asn Lys Ser Phe Tyr Gln Leu Ser  
340 345 350

Phe Asp Gly Gly His Leu Thr Gln Tyr Gly Gly Leu Ile Phe Phe Gln  
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Glu Leu Phe Ser Gln Leu Lys Leu Lys Glu Arg Ile Ser Lys Tyr Leu  
370 375 380

Val Thr Asn Asp Gln Arg Arg Tyr Cys Arg Tyr Ser Asp Ser Asp Ile  
385 390 395 400

Leu Val Gln Phe Leu Phe Gln Leu Leu Thr Gly Tyr Gly Thr Asp Tyr  
405 410 415

Ala Cys Lys Glu Leu Ser Ala Asp Ala Tyr Phe Pro Lys Leu Leu Glu  
420 425 430

Gly Gly Gln Leu Ala Ser Gln Pro Thr Leu Ser Arg Phe Leu Ser Arg  
Page 355

435 440 445  
 Thr Asp Glu Glu Thr Val His Ser Leu Arg Cys Leu Asn Leu Glu Leu  
 450 455 460  
 Val Glu Phe Phe Leu Gln Phe His Gln Leu Asn Gln Leu Ile Val Asp  
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 485 490 495  
 Tyr Asn Ala His Tyr Arg Ala His Gly Tyr His Pro Leu Tyr Ala Phe  
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 Glu Gly Lys Thr Gly Tyr Cys Phe Asn Ala Gln Leu Arg Pro Gly Asn  
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 Leu Lys Lys Asn Thr Val Leu Ser Arg Leu Gly Asp Leu Ser Leu Pro  
 580 585 590  
 Cys Pro Gln Asp Glu Asp Leu Thr Ile Leu Pro His Ser Ala Tyr Ser  
 595 600 605  
 Glu Thr Leu Tyr Gln Ala Gly Ser Trp Ser His Lys Arg Arg Val Cys  
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 Gln Phe Ser Glu Arg Lys Glu Gly Asn Leu Phe Tyr Asp Val Ile Ser  
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 Leu Val Thr Asn Met Thr Ser Gly Thr Ser Gln Asp Gln Phe Gln Leu  
 645 650 655  
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 Gly Phe Phe Gly Asp Lys Thr Asp Ser Ser Thr Leu Ile Lys Asn Glu  
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Val Arg Met Met Met Ser Cys Ile Ala Tyr Asn Leu Tyr Leu Phe Leu  
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Lys His Leu Ala Gly Gly Asp Phe Gln Thr Leu Thr Ile Lys Arg Phe  
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Arg His Leu Phe Leu His Val Val Gly Lys Cys Val Arg Thr Gly Arg  
725 730 735

Lys Gln Leu Leu Lys Leu Ser Ser Leu Tyr Ala Tyr Ser Glu Leu Phe  
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<210> 239  
<211> 693  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 239

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Ser Ser Asn Arg Ala Asn Glu Ser Gln Ala Glu Gln Gly Glu Gln Pro  
50 55 60

Lys Lys Leu Asp Ser Glu Arg Asp Lys Ala Arg Lys Glu Val Glu Glu  
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Tyr Val Lys Lys Ile Val Gly Glu Ser Tyr Ala Lys Ser Thr Lys Lys  
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Arg His Thr Ile Thr Val Ala Leu Val Asn Glu Leu Asn Asn Ile Lys  
100 105 110

Asn Glu Tyr Leu Asn Lys Ile Val Glu Ser Thr Ser Glu Ser Gln Leu  
115 120 125

Gln Ile Leu Met Met Glu Ser Arg Ser Lys Val Asp Glu Ala Val Ser  
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 Lys Phe Glu Lys Asp Ser Ser Ser Ser Ser Ser Ser Asp Ser Ser Thr  
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 Lys Pro Glu Ala Ser Asp Thr Ala Lys Pro Asn Lys Pro Thr Glu Pro  
 165 170 175  
 Gly Glu Lys Val Ala Glu Ala Lys Lys Lys Val Glu Glu Ala Glu Lys  
 180 185 190  
 Lys Ala Lys Asp Gln Lys Glu Glu Asp Arg Arg Asn Tyr Pro Thr Ile  
 195 200 205  
 Thr Tyr Lys Thr Leu Glu Leu Glu Ile Ala Glu Ser Asp Val Glu Val  
 210 215 220  
 Lys Lys Ala Glu Leu Glu Leu Val Lys Val Lys Ala Asn Glu Pro Arg  
 225 230 235 240  
 Asp Glu Gln Lys Ile Lys Gln Ala Glu Ala Glu Val Glu Ser Lys Gln  
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 260 265 270  
 Glu Glu Glu Ala Lys Arg Arg Ala Asp Ala Lys Glu Gln Gly Lys Pro  
 275 280 285  
 Lys Gly Arg Ala Lys Arg Gly Val Pro Gly Glu Leu Ala Thr Pro Asp  
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 Lys Lys Glu Asn Asp Ala Lys Ser Ser Asp Ser Ser Val Gly Glu Glu  
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 Thr Leu Pro Ser Pro Ser Leu Lys Pro Glu Lys Lys Val Ala Glu Ala  
 325 330 335  
 Glu Lys Lys Val Glu Glu Ala Lys Lys Lys Ala Glu Asp Gln Lys Glu  
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 Glu Ile Ala Glu Ser Asp Val Glu Val Lys Lys Ala Glu Leu Glu Leu  
 370 375 380

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 420 425 430  
 Ala Ala Glu Glu Asp Lys Val Lys Glu Lys Pro Ala Glu Gln Pro Gln  
 435 440 445  
 Pro Ala Pro Ala Pro Lys Ala Glu Lys Pro Ala Pro Ala Pro Lys Pro  
 450 455 460  
 Glu Asn Pro Ala Glu Gln Pro Lys Ala Glu Lys Pro Ala Asp Gln Gln  
 465 470 475 480  
 Ala Glu Glu Asp Tyr Ala Arg Arg Ser Glu Glu Glu Tyr Asn Arg Leu  
 485 490 495  
 Thr Gln Gln Gln Pro Pro Lys Thr Glu Lys Pro Ala Gln Pro Ser Thr  
 500 505 510  
 Pro Lys Thr Gly Trp Lys Gln Glu Asn Gly Met Trp Tyr Phe Tyr Asn  
 515 520 525  
 Thr Asp Gly Ser Met Ala Thr Gly Trp Leu Gln Asn Asn Gly Ser Trp  
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 Tyr Tyr Leu Asn Ser Asn Gly Ala Met Ala Thr Gly Trp Leu Gln Asn  
 545 550 555 560  
 Asn Gly Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Ser Met Ala Thr Gly  
 565 570 575  
 Trp Leu Gln Asn Asn Gly Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Ser  
 580 585 590  
 Met Ala Thr Gly Trp Leu Gln Tyr Asn Gly Ser Trp Tyr Tyr Leu Asn  
 595 600 605  
 Ala Asn Gly Ser Met Ala Thr Gly Trp Leu Gln Tyr Asn Gly Ser Trp  
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 Tyr Tyr Leu Asn Ala Asn Gly Asp Met Ala Thr Gly Trp Val Lys Asp  
 625 630 635 640

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Gly Asp Thr Trp Tyr Tyr Leu Glu Ala Ser Gly Ala Met Lys Ala Ser  
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Gly Glu Trp Val Asn  
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<211> 810  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 240

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Asp Tyr Pro Tyr Glu Met Asp Arg Leu Glu Glu Val Ala Leu Glu Leu  
50 55 60

Thr Glu Thr Asp Tyr Ser Gln Asp Glu Thr Phe Thr Glu Leu Pro Phe  
65 70 75 80

Ser Arg Arg Leu Gln Val Leu Phe Asp Glu Ala Glu Tyr Val Ala Ser  
85 90 95

Val Val His Ala Lys Val Leu Gly Thr Glu His Val Leu Tyr Ala Ile  
100 105 110

Leu His Asp Ser Asn Ala Leu Ala Thr Arg Ile Leu Glu Arg Ala Gly  
115 120 125

Phe Ser Tyr Glu Asp Lys Lys Asp Gln Val Lys Ile Ala Ala Leu Arg  
130 135 140

Arg Asn Leu Glu Glu Arg Ala Gly Trp Thr Arg Glu Asp Leu Lys Ala  
145 150 155 160

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Leu Arg Gln Arg His Arg Thr Val Ala Asp Lys Gln Asn Ser Met Ala  
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 Thr His Asp Leu Thr Glu Gln Ala Arg Ser Gly Lys Leu Glu Pro Val  
 195 200 205  
 Ile Gly Arg Asp Lys Glu Ile Ser Arg Met Ile Gln Ile Leu Ser Arg  
 210 215 220  
 Lys Thr Lys Asn Asn Pro Val Leu Val Gly Asp Ala Gly Val Gly Lys  
 225 230 235 240  
 Thr Ala Leu Ala Leu Gly Leu Ala Gln Arg Ile Ala Ser Gly Asp Val  
 245 250 255  
 Pro Ala Glu Met Ala Lys Met Arg Val Leu Glu Leu Asp Leu Met Asn  
 260 265 270  
 Val Val Ala Gly Thr Arg Phe Arg Gly Asp Phe Glu Glu Arg Met Asn  
 275 280 285  
 Asn Ile Ile Lys Asp Ile Glu Glu Asp Gly Gln Val Ile Leu Phe Ile  
 290 295 300  
 Asp Glu Leu His Thr Ile Met Gly Ser Gly Ser Gly Ile Asp Ser Thr  
 305 310 315 320  
 Leu Asp Ala Ala Asn Ile Leu Lys Pro Ala Leu Ala Arg Gly Thr Leu  
 325 330 335  
 Arg Thr Val Gly Ala Thr Thr Gln Glu Glu Tyr Gln Lys His Ile Glu  
 340 345 350  
 Lys Asp Ala Ala Leu Ser Arg Arg Phe Ala Lys Val Thr Ile Glu Glu  
 355 360 365  
 Pro Ser Val Ala Asp Ser Met Thr Ile Leu Gln Gly Leu Lys Ala Thr  
 370 375 380  
 Tyr Glu Lys His His Arg Val Gln Ile Thr Asp Glu Ala Val Glu Thr  
 385 390 395 400

Ala Val Lys Met Ala His Arg Tyr Leu Thr Ser Arg His Leu Pro Asp  
 Page 361

Ser Ala Ile Asp Leu Leu Asp Glu Ala Ala Ala Thr Val Gln Asn Lys  
420 425 430

Ala Lys His Val Lys Ala Asp Asp Ser Asp Leu Ser Pro Ala Asp Lys  
435 440 445

Ala Leu Met Asp Gly Lys Trp Lys Gln Ala Ala Gln Leu Ile Ala Lys  
450 455 460

Glu Glu Glu Val Pro Val Tyr Lys Asp Leu Val Thr Glu Ser Asp Ile  
465 470 475 480

Leu Thr Thr Leu Ser Arg Leu Ser Gly Ile Pro Val Gln Lys Leu Thr  
485 490 495

Gln Thr Asp Ala Lys Lys Tyr Leu Asn Leu Glu Ala Glu Leu His Lys  
500 505 510

Arg Val Ile Gly Gln Asp Gln Ala Val Ser Ser Ile Ser Arg Ala Ile  
515 520 525

Arg Arg Asn Gln Ser Gly Ile Arg Ser His Lys Arg Pro Ile Gly Ser  
530 535 540

Phe Met Phe Leu Gly Pro Thr Gly Val Gly Lys Thr Glu Leu Ala Lys  
545 550 555 560

Ala Leu Ala Glu Val Leu Phe Asp Asp Glu Ser Ala Leu Ile Arg Phe  
565 570 575

Asp Met Ser Glu Tyr Met Glu Lys Phe Ala Ala Ser Arg Leu Asn Gly  
580 585 590

Ala Pro Pro Gly Tyr Val Gly Tyr Glu Glu Gly Gly Glu Leu Thr Glu  
595 600 605

Lys Val Arg Asn Lys Pro Tyr Ser Val Leu Leu Phe Asp Glu Val Glu  
610 615 620

Lys Ala His Pro Asp Ile Phe Asn Val Leu Leu Gln Val Leu Asp Asp  
625 630 635 640

Gly Val Leu Thr Asp Ser Lys Gly Arg Lys Val Asp Phe Ser Asn Thr  
645 650 655

Ile Ile Ile Met Thr Ser Asn Leu Gly Ala Thr Ala Leu Arg Asp Asp  
 660 665 670  
 Lys Thr Val Gly Phe Gly Ala Lys Asp Ile Arg Phe Asp Gln Glu Asn  
 675 680 685  
 Met Glu Lys Arg Met Phe Glu Glu Leu Lys Lys Ala Tyr Arg Pro Glu  
 690 695 700  
 Phe Ile Asn Arg Ile Asp Glu Lys Val Val Phe His Ser Leu Ser Ser  
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 Asp His Met Gln Glu Val Val Lys Ile Met Val Lys Pro Leu Val Ala  
 725 730 735  
 Ser Leu Thr Glu Lys Gly Ile Asp Leu Lys Leu Gln Ala Ser Ala Leu  
 740 745 750  
 Lys Leu Leu Ala Asn Gln Gly Tyr Asp Pro Glu Met Gly Ala Arg Pro  
 755 760 765  
 Leu Arg Arg Thr Leu Gln Thr Glu Val Glu Asp Lys Leu Ala Glu Leu  
 770 775 780  
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 <211> 448  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 241

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 35 40 45  
 Ala Arg Gly Asp Asp Tyr Pro Ala Tyr Tyr Lys Asn Gly Ser Gln Glu  
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 Asn Ala Asn Glu Trp Gly His Arg Ala Arg Arg Glu Gly Tyr Arg Val  
 100 105 110  
 Asp Asn Thr Pro Thr Ile Gly Ser Ile Thr Trp Ser Thr Ala Gly Thr  
 115 120 125  
 Tyr Gly His Val Ala Trp Val Ser Asn Val Met Gly Asp Gln Ile Glu  
 130 135 140  
 Ile Glu Glu Tyr Asn Tyr Gly Tyr Thr Glu Ser Tyr Asn Lys Arg Val  
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 Ile Lys Ala Asn Thr Met Thr Gly Phe Ile His Phe Lys Asp Leu Asp  
 165 170 175  
 Gly Gly Ser Val Gly Asn Ser Gln Ser Ser Thr Ser Thr Gly Gly Thr  
 180 185 190  
 His Tyr Phe Lys Thr Lys Ser Ala Ile Lys Thr Glu Pro Leu Ala Ser  
 195 200 205  
 Gly Thr Val Ile Asp Tyr Tyr Tyr Pro Gly Glu Lys Val His Tyr Asp  
 210 215 220  
 Gln Ile Leu Glu Lys Asp Gly Tyr Lys Trp Leu Ser Tyr Thr Ala Tyr  
 225 230 235 240  
 Asn Gly Ser Tyr Arg Tyr Val Gln Leu Glu Ala Val Asn Lys Asn Pro  
 245 250 255  
 Leu Gly Asn Ser Val Leu Ser Ser Thr Gly Gly Thr His Tyr Phe Lys  
 260 265 270  
 Thr Lys Ser Ala Ile Lys Thr Glu Pro Leu Val Ser Ala Thr Val Ile  
 275 280 285  
 Asp Tyr Tyr Tyr Pro Gly Glu Lys Val His Tyr Asp Gln Ile Leu Glu  
 290 295 300  
 Lys Asp Gly Tyr Lys Trp Leu Ser Tyr Thr Ala Tyr Asn Gly Ser Arg  
 305 310 315 320



1028462\_1.TXT

Arg Tyr Ile Gln Leu Glu Gly Val Thr Ser Ser Gln Asn Tyr Gln Asn  
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Gln Ser Gly Asn Ile Ser Ser Tyr Gly Ser His Ser Ser Ser Thr Val  
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Gly Trp Lys Lys Ile Asn Gly Ser Trp Tyr His Phe Lys Ser Asn Gly  
355 360 365

Ser Lys Ser Thr Gly Trp Leu Lys Asp Gly Ser Ser Trp Tyr Tyr Leu  
370 375 380

Lys Leu Ser Gly Glu Met Gln Thr Gly Trp Leu Lys Glu Asn Gly Leu  
385 390 395 400

Trp Tyr Tyr Leu Gly Ser Ser Gly Ala Met Lys Thr Gly Trp Tyr Gln  
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Val Ser Gly Lys Trp Tyr Tyr Ser Tyr Ser Ser Gly Ala Leu Ala Val  
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<210> 242  
<211> 150  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 242

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35 40 45

Gly Lys Gln Lys Ser Glu Glu Lys Ala His Ala Glu Met Ile Ala Glu  
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Gly Lys Ala Ile Lys Ala Gln Leu Glu Ala Glu Glu Thr Val Val Glu  
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Phe Val Glu Lys Val Gly Pro Asp Gly Arg Thr Phe Gly Ser Ile Thr  
85 90 95

1028462\_1.TXT

Asn Lys Lys Ile Ala Glu Glu Leu Gln Lys Gln Phe Gly Ile Lys Ile  
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Asp Lys Arg His Ile Gln Val Gln Ala Pro Ile Arg Ala Val Gly Leu  
115 120 125

Ile Asp Val Pro Val Lys Ile Tyr Gln Asp Ile Thr Ser Val Ile Asn  
130 135 140

Leu Arg Val Lys Glu Gly  
145 150

<210> 243  
<211> 392  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 243

Met Lys Lys Lys Ile Leu Ala Ser Leu Leu Leu Ser Thr Val Met Val  
1 5 10 15

Ser Gln Val Ala Val Leu Thr Thr Ala His Ala Glu Thr Thr Asp Asp  
20 25 30

Lys Ile Ala Ala Gln Asp Asn Lys Ile Ser Asn Leu Thr Ala Gln Gln  
35 40 45

Gln Glu Ala Gln Lys Gln Val Asp Gln Ile Gln Glu Gln Val Ser Ala  
50 55 60

Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala Glu Asn Asp Arg Leu Gln  
65 70 75 80

Ala Glu Ser Lys Lys Leu Glu Gly Glu Ile Thr Glu Leu Ser Lys Asn  
85 90 95

Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln Ala Arg Ser Ala Gln  
100 105 110

Thr Asn Gly Ala Val Thr Ser Tyr Ile Asn Thr Ile Val Asn Ser Lys  
115 120 125

Ser Ile Thr Glu Ala Ile Ser Arg Val Ala Ala Met Ser Glu Ile Val  
130 135 140

Ser Ala Asn Asn Lys Met Leu Glu Gln Gln Lys Ala Asp Lys Lys Ala  
145 150 155 160

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Ile Ser Glu Lys Gln Val Ala Asn Asn Asp Ala Ile Asn Thr Val Ile  
 165 170 175  
 Ala Asn Gln Gln Lys Leu Ala Asp Asp Ala Gln Ala Leu Thr Thr Lys  
 180 185 190  
 Gln Ala Glu Leu Lys Ala Ala Glu Leu Ser Leu Ala Ala Glu Lys Ala  
 195 200 205  
 Thr Ala Glu Gly Glu Lys Ala Ser Leu Leu Glu Gln Lys Ala Ala Ala  
 210 215 220  
 Glu Ala Glu Ala Arg Ala Ala Ala Val Ala Glu Ala Ala Tyr Lys Glu  
 225 230 235 240  
 Lys Arg Ala Ser Gln Gln Gln Ser Val Leu Ala Ser Ala Asn Thr Asn  
 245 250 255  
 Leu Thr Ala Gln Val Gln Ala Val Ser Glu Ser Ala Ala Ala Pro Val  
 260 265 270  
 Arg Ala Lys Val Arg Pro Thr Tyr Ser Thr Asn Ala Ser Ser Tyr Pro  
 275 280 285  
 Ile Gly Glu Cys Thr Trp Gly Val Lys Thr Leu Ala Pro Trp Ala Gly  
 290 295 300  
 Asp Tyr Trp Gly Asn Gly Ala Gln Trp Ala Thr Ser Ala Ala Ala Ala  
 305 310 315 320  
 Gly Phe Arg Thr Gly Ser Thr Pro Gln Val Gly Ala Ile Ala Cys Trp  
 325 330 335  
 Asn Asp Gly Gly Tyr Gly His Val Ala Val Val Thr Ala Val Glu Ser  
 340 345 350  
 Thr Thr Arg Ile Gln Val Ser Glu Ser Asn Tyr Ala Gly Asn Arg Thr  
 355 360 365  
 Ile Gly Asn His Arg Gly Trp Phe Asn Pro Thr Thr Thr Ser Glu Gly  
 370 375 380  
 Phe Val Thr Tyr Ile Tyr Ala Asp  
 385 390

<210> 244  
 <211> 129

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<212> PRT

<213> Streptococcus pneumoniae

<400> 244

Met Val Lys Arg Arg Ile Arg Arg Gly Thr Arg Glu Pro Glu Lys Val  
1 5 10 15

Val Val Pro Glu Gln Ser Ser Ile Pro Ser Tyr Pro Val Ser Val Thr  
20 25 30

Ser Asn Gln Gly Thr Asp Val Ala Val Glu Pro Ala Lys Ala Val Ala  
35 40 45

Pro Thr Thr Asp Trp Lys Gln Glu Asn Gly Met Trp Tyr Phe Tyr Asn  
50 55 60

Thr Asp Gly Ser Met Ala Thr Gly Trp Val Gln Val Asn Ser Ser Trp  
65 70 75 80

Tyr Tyr Leu Asn Ser Asn Gly Ser Met Lys Val Asn Gln Trp Phe Gln  
85 90 95

Val Gly Gly Lys Trp Tyr Tyr Val Asn Thr Ser Gly Glu Leu Ala Val  
100 105 110

Asn Thr Ser Ile Asp Gly Tyr Arg Val Asn Asp Asn Gly Glu Trp Val  
115 120 125

Arg

<210> 245

<211> 46

<212> PRT

<213> Streptococcus pneumoniae

<400> 245

Glu Leu Arg Arg Leu Ser Arg Leu Val Asp Gln Glu Leu Tyr Phe Gly  
1 5 10 15

Cys Gly Trp Arg Leu Ser Leu Glu Trp Leu Pro Ser Met Arg Lys Asp  
20 25 30

Ser Trp Pro Ser Asn Thr Ala Pro Arg Thr Thr Met Val Gln  
35 40 45

<210> 246

<211> 31

<212> PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 246

Asp Cys Ile Arg Lys Gln Pro Phe Thr Arg Asp Glu Pro Asn Lys Thr  
 1 5 10 15

Cys Arg Lys Thr Lys Pro Ser Lys Ser Tyr Cys Ser Tyr Arg Trp  
 20 25 30

&lt;210&gt; 247

&lt;211&gt; 26

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 247

Gly Gln Arg Asn Pro Arg Arg Ile Glu Arg Val Ile Arg Met Ala Glu  
 1 5 10 15

Thr Lys Pro Arg Ile Ser Lys Lys Glu Gly  
 20 25

&lt;210&gt; 248

&lt;211&gt; 83

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 248

Gln Arg Lys Leu Phe Lys Ile Phe His Leu Phe Gln Lys Lys Ser Gly  
 1 5 10 15

Trp Asn Gln Lys Ser Ser Cys Leu Lys Leu Asn Leu Asn Ser Leu Asn  
 20 25 30

Arg Lys Met Thr Gln Met Thr Lys Met Phe Arg Ser Ile Phe Gln Pro  
 35 40 45

Lys Lys Pro Leu Asn Thr Asn Phe Gln Ala Tyr Asn Ser Leu His Gln  
 50 55 60

Ile Asn Gln Lys Ile Ser Leu Lys Arg Arg Lys Leu Ser Glu Lys Ile  
 65 70 75 80

Ser Lys Ser

&lt;210&gt; 249

&lt;211&gt; 104

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae

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<400> 249

Leu Val Ile Ile Val Leu Lys Ile Gln Ser Lys Ser Glu Thr Asp Phe  
1 5 10 15

Ile Phe Lys Thr Trp Pro Phe Ile Leu Leu Ser Lys Ile Ile Pro Leu  
20 25 30

Met Val Leu Asp Cys Gln Val Ser Ile Ser Trp Thr Asn Arg Glu Thr  
35 40 45

Val Ala Tyr Ser Lys Leu Leu Ala Ile Lys Thr Leu Lys Gly Asp Tyr  
50 55 60

His Asp Gly Gln Ser Lys Lys Ile Arg Leu Ser His Ala Ser Arg Val  
65 70 75 80

Arg Thr Pro Ser Trp Tyr Pro His Asp Met Ala Asp Ser Thr Arg Ile  
85 90 95

Met Ala Phe Ser Arg Lys Gly Cys  
100

<210> 250

<211> 30

<212> PRT

<213> Streptococcus pneumoniae

<400> 250

Glu Arg Leu Pro Ala Phe Pro Arg Ser Leu Ser Gly Arg Lys Leu Asp  
1 5 10 15

Gln Gly Gly Thr Lys Glu Lys Gly Ser Asp Gly Arg Ser Pro  
20 25 30

<210> 251

<211> 245

<212> PRT

<213> Streptococcus pneumoniae

<400> 251

Arg Asn Cys Leu Ser Thr Trp Lys Ser Ser Ser Asn Tyr His Thr Glu  
1 5 10 15

Ile Lys Arg Gly Thr Val Arg Gln Cys Leu Gly Lys Gly Arg Phe Lys  
20 25 30

Glu Val Tyr Ser Ala Asp Tyr Ala Gln Gln Ser Tyr Glu Asn Asn Arg  
35 40 45

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Lys Arg Ser Val Lys Lys Ser Ser Leu Thr Lys Glu Leu Lys Glu Lys  
50 55 60

Ile Leu His Tyr His Asn Gln Lys Phe Ser Pro Glu Met Met Val Met  
65 70 75 80

Ala Lys Gly Val Asn Val Gly Ile Ser Thr Ile Tyr Tyr Trp Ile His  
85 90 95

His Gly Lys Leu Gly Leu Ser Lys Gln Asp Leu Leu Tyr Pro Arg Lys  
100 105 110

Gly Lys Ala Leu Lys Lys Gln Ala Ser Thr Asn Phe Lys Pro Ala Gly  
115 120 125

Gln Ser Ile Glu Gln Arg Pro Glu Ala Ile Asn Leu Arg Leu Glu Asn  
130 135 140

Gly His Tyr Glu Ile Asp Thr Val Leu Leu Thr Arg Ser Lys Asn Tyr  
145 150 155 160

Cys Leu Ile Val Leu Thr Asp Arg Lys Ser Arg His Gln Ile Ile Arg  
165 170 175

Leu Ile Pro Asn Lys Ser Ala Glu Val Val Asn Gln Ala Leu Lys Leu  
180 185 190

Ile Leu Lys Gln His Lys Ile Leu Ser Ile Thr Ala Asp Asn Gly Thr  
195 200 205

Glu Phe Asn Arg Leu Phe Asp Ile Phe Ser Glu Glu His Ile Tyr Tyr  
210 215 220

Ala His Pro Tyr Ala Ser Trp Glu Arg Gly Thr Asn Glu Asn His Asn  
225 230 235 240

Arg Leu Ile Arg Arg  
245

<210> 252  
<211> 36  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 252

Pro Val Met Thr Ile Ser Ser Pro Thr Met Lys Asn Met Asp Leu Ser  
1 5 10 15

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Thr Lys Ala Ser Pro Ser Gln Pro Leu Gln Gly Lys His Gly Met Ile  
20 25 30

Trp Ser Gly Lys  
35

<210> 253  
<211> 28  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 253

Thr Ser Ser Ile Arg Ile His Thr Arg Lys Ser Ser Pro Asn Trp Thr  
1 5 10 15

Thr Thr Pro His Leu Ala Leu Ser Ala Glu Thr Asn  
20 25

<210> 254  
<211> 27  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 254

Tyr Phe Leu Pro His Lys Tyr Ala Arg Glu Ser Leu Ser Leu Pro Ser  
1 5 10 15

Thr Asn Lys Ile Leu His Arg Lys Gln Gly Ser  
20 25

<210> 255  
<211> 53  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 255

Ala Ala Phe Lys Lys Asp Gln Ile Asn Glu Arg Val Glu Lys Leu Gly  
1 5 10 15

Lys Leu Lys Pro Ile Thr Ile Asn Tyr Asn Gly Lys Ser Glu Val Ile  
20 25 30

Asp Ser Lys Glu Lys Leu Gln Glu Leu Met Asn Lys Ala Val Lys Asp  
35 40 45

Glu Val Ala Gln Ile  
50

<210> 256



<211> 33  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 256

Ala Tyr Ala His Ser Lys Arg Ser Ala Gly Ser Gly Arg Ala Gly Gly  
 1 5 10 15  
 Arg Gln Cys Leu Cys Gln Cys Gln Asn Lys Cys Arg Arg Asp Phe Lys  
 20 25 30

Tyr

<210> 257  
 <211> 36  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 257

His Gly Arg Pro Tyr His Lys Pro His Gln Pro His His His Gly Phe  
 1 5 10 15  
 Pro Gln Gln Ser Tyr Asn Leu Leu Pro Pro Lys His Lys Pro Thr Leu  
 20 25 30

Cys Val Arg Arg  
 35

<210> 258  
 <211> 130  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 258

Lys Gly Lys Ile Leu Leu Leu Pro Arg Leu Thr Thr Gln Arg Trp Gln  
 1 5 10 15  
 Arg Lys Ile Arg Pro Asp Ser Arg Lys Ser Ala Asn Asn Lys Ala Asn  
 20 25 30

Leu Asp Phe His Asn Ser Arg Cys Lys Ser Ser Leu Ser Asp Glu Ala  
 35 40 45

Pro Asn Leu His Lys Asn Pro Ala Leu Leu Val His Ser Leu Ser Arg  
 50 55 60

Val Ile Ala Val Leu Leu Glu Leu Ser Pro Leu Gln Ala Tyr Ser Ile  
 65 70 75 80

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Val Lys Phe Ser Pro Lys Glu Asp Asp Leu Ile His Asp Asp Ala Ile  
85 90 95

Leu Val Arg Phe Gly Ile Leu Glu Val His Asp Ser Pro Tyr Glu Leu  
100 105 110

Leu Leu Leu Tyr His Thr His Ser Tyr Arg Phe Ser Cys Ser Ile Tyr  
115 120 125

Leu Ser  
130

<210> 259  
<211> 144  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 259

Phe Thr Val Ser His Val Phe Leu Leu Tyr Leu Ser Phe Asn Pro Arg  
1 5 10 15

Pro Lys Ser Met Ser Leu Ser Phe Thr Ser Ser Lys Leu Leu Arg Pro  
20 25 30

Arg Phe Arg Thr Phe Ile Ile Ser Ala Ser Asp Phe Ser Val Lys Ser  
35 40 45

Cys Thr Val Leu Ile Pro Ala Arg Phe Lys Gln Leu Tyr Glu Arg Thr  
50 55 60

Asp Lys Ser Ser Ser Ser Ile Val Arg Ser Lys Ile Arg Ser Ser Asp  
65 70 75 80

Ser Val Ser Ala Ser Phe Ile Thr Ser Val Asp Leu Ala Ile Ser Val  
85 90 95

Arg Phe Val Asn Lys Ser Arg Cys Ser Val Lys Ile Arg Ala Glu Ser  
100 105 110

Pro Lys Ala Ser Ser Gly Ile Ile Val Pro Phe Val Lys Ile Ser Arg  
115 120 125

Val Asn Leu Ser Lys Pro Ser Leu Leu Pro Thr Arg Ala Gly Ser Thr  
130 135 140

<210> 260  
<211> 18  
<212> PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 260

Leu Val Cys Met Lys Asn Lys Gly Cys Tyr Lys Glu Arg Asn Asn Cys  
 1 5 10 15

Cys His

&lt;210&gt; 261

&lt;211&gt; 58

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 261

Phe His Tyr Leu Ser Lys Tyr Phe Leu Val Ser Ala Ile Thr Thr Gly  
 1 5 10 15

Asp Lys Thr Lys Arg Ala Ile Lys Phe Gly Arg Ala Ile Lys Ala Leu  
 20 25 30

Thr Ile Ser Ala Ile Ile Gln Thr Ile Ser Asn Ser Ile Asn Pro Pro  
 35 40 45

Asn Lys Thr Met Ser Thr Lys Thr Thr Arg  
 50 55

&lt;210&gt; 262

&lt;211&gt; 47

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 262

Gly Lys Lys Val Phe Ile Lys Tyr Pro Leu Ser Arg Val Ser Ser Lys  
 1 5 10 15

Thr Gly Pro Met Ile Thr Gly Arg Thr Lys Asp Lys Ile Val Asp Lys  
 20 25 30

Lys Val Gly Cys Pro Phe Glu Lys Ser Thr Val Lys Tyr Ser Ser  
 35 40 45

&lt;210&gt; 263

&lt;211&gt; 37

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 263

Ser Ser Pro Val Phe Pro Lys Leu Val Met Val Ser Gly Ala Asn Lys  
 1 5 10 15

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Pro Arg Glu Arg Arg Asn Phe Pro Phe Ser Ser Lys Met Ser Phe His  
20 25 30

Leu Thr Phe Val Leu  
35

<210> 264  
<211> 77  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 264

Tyr Leu Thr Ser Phe Ser Val Pro Lys Ile Ala Ser Ser Lys Val Lys  
1 5 10 15

Leu Thr Arg Tyr Trp Arg Ser Ser Pro Trp Arg Gly Ala Phe Gly Leu  
20 25 30

Arg Glu Glu Pro Pro Pro Pro Lys Lys Leu Glu Lys Ile Ser Ser Lys  
35 40 45

Pro Pro Lys Pro Pro Ala Pro Leu Lys Pro Pro Lys Pro Pro Ala Pro  
50 55 60

Pro Lys Pro Pro Leu Ala Pro Ala Ala Pro Tyr Trp Ser  
65 70 75

<210> 265  
<211> 89  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 265

Gln Ser Trp Arg Pro Ile Pro Asp Ser Lys Cys Tyr Thr Gln Glu Lys  
1 5 10 15

Leu Thr Ile Pro Ile Lys Arg Arg Lys Asp Ile Lys Asp Phe Tyr His  
20 25 30

Asn Ser Ile Gln Arg His Lys Asn Ser His Lys Ser His Leu Leu Asp  
35 40 45

Ser Tyr Arg Leu Ile Ile Thr Arg Leu Ala Glu Ile Val His Glu Asn  
50 55 60

Lys Ile Leu Ile Val Leu Ile Leu Tyr Val Thr Asn Ile Pro Ser Arg  
65 70 75 80

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Ser Arg Arg Tyr Glu Val Asn Arg Val  
85

<210> 266  
<211> 60  
<212> PRT  
<213> Streptococcus pneumoniae  
<400> 266

Leu Phe Arg Phe Tyr Arg Val Ile Val Leu Tyr Arg Gly Trp His Ile  
1 5 10 15

Tyr Leu Leu Ile Leu Val Asn Leu Gln Tyr Val Gln Asn Val Phe Arg  
20 25 30

Lys Asp Arg Phe Leu Val Arg Gly Ala Gln Pro Phe Phe His Gly Glu  
35 40 45

Arg Ser Ala Gly His Leu Val Leu Pro Tyr Val Leu  
50 55 60

<210> 267  
<211> 60  
<212> PRT  
<213> Streptococcus pneumoniae  
<400> 267

Ile Thr His Pro Pro Leu Asn Pro Glu His Phe Val Ser Arg Val Phe  
1 5 10 15

Ser Ser Leu Gly Leu Lys Ser Tyr Gln Pro Lys Asp Asp Arg Phe Leu  
20 25 30

Arg Lys Pro Ser Asp Ser Arg His Pro Glu Ser Gly Asn Ser Gly Lys  
35 40 45

Trp Gln Val Leu Asn Ser Pro Leu Val Ile Val Lys  
50 55 60

<210> 268  
<211> 30  
<212> PRT  
<213> Streptococcus pneumoniae  
<400> 268

Thr Leu Ala Lys Ala Val Gly Leu Met Tyr Ser Pro Pro Ile Pro Pro  
1 5 10 15

Lys Pro Phe Leu Gly Arg Ile Thr Thr Asp Ser Ser Ser Ile  
Page 377

20

25

30

<210> 269  
 <211> 83  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 269

Pro Gly Ser Pro Phe Ser Glu Ile Ser Gly Ala Gly Phe Phe Gly Val  
 1 5 10 15

Ala Lys Arg Ile Phe Pro Arg Pro Pro Arg Pro Pro Trp Ala Thr Ile  
 20 25 30

Asn Ser Cys Pro Cys Ser Ile Lys Ser Val Lys Thr Leu Pro Val Ser  
 35 40 45

Ala Ser Arg Thr Val Val Pro Cys Gly Thr Arg Thr Leu Arg Ser Ser  
 50 55 60

Ala Pro Arg Pro Cys Ile Pro Leu Val Ile Pro Phe Ser Pro Glu Ser  
 65 70 75 80

Ala Leu Lys

<210> 270  
 <211> 111  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 270

Ile Asn Ser Leu Thr Leu Ala Thr Ser Leu Ser Lys Arg Arg Ala Pro  
 1 5 10 15

Arg Lys Ala Ser Lys Ala Ser Pro Arg Met Val Ser Arg Leu Arg Pro  
 20 25 30

Pro Asp Phe Ser Ser Pro Leu Pro Asn Leu Ile Asn Trp Ser Asn Trp  
 35 40 45

Gln Ser Arg Ala Lys Pro Ala Lys Leu Ser Ser Arg Thr Ile Ile Ala  
 50 55 60

Arg Ser Phe Asp Arg Ser Pro Ser Gly Phe Leu Gly Tyr Phe Leu Tyr  
 65 70 75 80

Arg Tyr Ser Glu Ile Asn Asn Cys Arg Thr Ala Ser Pro Lys Asn Ser  
 85 90 95

1028462\_1.TXT

Lys Arg Ser Leu Cys Glu Ile Phe Lys Arg Arg Cys Ser Leu Ala  
100 105 110

<210> 271  
<211> 49  
<212> PRT  
<213> Streptococcus pneumoniae  
<400> 271

Pro Ile Gly Lys Arg Asn Cys Lys Ala Glu Cys Gln Ser His His Leu  
1 5 10 15

Leu Glu Lys Gln Lys Thr Phe Gln Ser Arg Lys Thr Lys Arg Tyr Gly  
20 25 30

Ala Ser Pro Glu Pro Arg Tyr Arg Glu Ser Arg Lys Pro Arg Leu Ser  
35 40 45

Gln

<210> 272  
<211> 58  
<212> PRT  
<213> Streptococcus pneumoniae  
<400> 272

Gln Pro Leu Gly His Ser Lys Ala Glu Glu His Glu Thr Ile Cys Ser  
1 5 10 15

His Thr Phe Asp Asn His Thr Thr Glu Thr Ile Pro Asn Gln Val Lys  
20 25 30

Gly Arg Asp Met Thr Ser Ser Glu Thr Leu Pro Phe Pro Ser Lys Asn  
35 40 45

Gln Asn Gln Gly Lys Ala Lys Gln Ile Pro  
50 55

<210> 273  
<211> 125  
<212> PRT  
<213> Streptococcus pneumoniae  
<400> 273

Pro Cys Ser Leu Pro Asp Tyr Gly Leu Val Gly Ser Gly Tyr His Ser  
1 5 10 15

Cys His Tyr Gln Ser Asn Asp Thr Arg Phe Leu Glu Ser His Gly Asn  
 20 25 30

Trp Arg Thr Leu Leu Tyr Ser Trp Ser Trp Ile Leu Cys Gln Glu Lys  
 35 40 45

Thr Leu Phe Pro His Asp Leu Ala Ser Leu Tyr Pro Ser Cys Val Arg  
 50 55 60

Thr Ser Ile His Arg Tyr Cys Leu Leu His Val Lys Lys Leu Arg Asn  
 65 70 75 80

Ser Ile Ser Thr Phe Phe Phe Thr His Ile Asp Lys Val Leu Val Gln  
 85 90 95

Ala His Ile Ile Ser Gln Phe Trp Met Lys Arg Thr Tyr Gln His Ile  
 100 105 110

Phe Phe Leu Gly Cys Asn Asn Leu Ile Val His Cys Cys  
 115 120 125

<210> 274  
 <211> 69  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 274

Arg Val Lys Asp Asn His Leu Asp Lys Leu Val Lys Ala Leu Lys  
 1 5 10 15

Arg Arg Ser Ser Thr Gln Tyr Tyr Ile His Gln Leu Leu Arg Lys Met  
 20 25 30

Ile Arg Leu Tyr Gly His Gln Gln Leu His Asn Asn Ser Glu Ile Leu  
 35 40 45

Val Tyr Ser Asp Tyr Gly His Val Asp Leu Leu Leu Leu Glu Thr Asn  
 50 55 60

Lys Ile Pro Val Tyr  
 65

<210> 275  
 <211> 40  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 275

Gln Val Ile Lys Ile Asp Ile Ala Thr Thr Asn Lys Thr Glu Ser Val  
 Page 380



1 5 10 15  
 Lys Ser Gln Ser Glu Arg Glu Lys Lys Arg Leu Thr Ser Ser Asn Ile  
 20 25 30  
 Leu Lys Val Arg Gly Arg Pro Ile  
 35 40  
 <210> 276  
 <211> 32  
 <212> PRT  
 <213> Streptococcus pneumoniae  
 <400> 276  
 Ala Phe Lys Ser Ser Lys Val Pro Ser Leu Asp Pro Ser Ser Thr Lys  
 1 5 10 15  
 Thr Tyr Ser Ile Ser Val Ser Lys Ser Gly Ser Lys Ala Ser Arg Ala  
 20 25 30  
 <210> 277  
 <211> 69  
 <212> PRT  
 <213> Streptococcus pneumoniae  
 <400> 277  
 Asp Lys Thr Asp Pro Leu Ala Arg Lys Leu Pro Asp Lys Ser Lys Pro  
 1 5 10 15  
 Ser Thr Ser Phe Cys Thr Lys Ser Leu Ser Pro Val Asn Met Ala Ser  
 20 25 30  
 Leu Thr Ser Ala Lys Pro Ser Lys Thr Lys Ala Ser Leu Gly Ile Cys  
 35 40 45  
 Ser Pro Ala Asp Lys Arg Met Thr Ser Pro Ser Thr Asn Ser Ser Gly  
 50 55 60  
 Leu Arg Ala Thr Ser  
 65  
 <210> 278  
 <211> 38  
 <212> PRT  
 <213> Streptococcus pneumoniae  
 <400> 278  
 Leu Cys Arg Leu Gln Thr Gln Ala Arg Pro Arg Gly Ser Val Thr Asn  
 1 5 10 15

1028462\_1.TXT

Leu Thr Lys Gln Asn Lys Val Tyr Arg Tyr Leu Asn Tyr Leu Arg Gln  
20 25 30

Thr Gln Leu Ser Ala Met  
35

<210> 279  
<211> 110  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 279

Cys Ile Gln Ser Ile Gly Asn Glu Gly Gln Cys Lys Gly Asn Ser Cys  
1 5 10 15

Tyr Val Gly Lys Glu Ile His Leu Ala Pro Ile Ser Asp Ile Val Gly  
20 25 30

His Lys Gly Lys Glu Glu Gly Asp Asp Gly Asn Asp Asp Gly Arg Gln  
35 40 45

Phe Tyr Leu Phe Leu Ala His Leu Val Gly Ser Ala Phe Leu Arg Ser  
50 55 60

Phe Pro Leu Leu Tyr Ser Lys Gly Ile Asn Glu Glu Gly Asp Gly Ile  
65 70 75 80

Gly Asn Asp Gly Arg Leu Ile Ser Lys Asp Ile Ile Asn Ser Thr Gly  
85 90 95

Gln Asn Gly Ile Asn Asn Thr Lys Val Ile Ser Pro Phe Ala  
100 105 110

<210> 280  
<211> 121  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 280

Thr Ser Thr Lys Leu Val Ile Asp Thr Thr Thr Phe Met Thr Phe Cys  
1 5 10 15

Thr Asn Asn Thr Lys Ser Ser Lys Phe Thr Asn Thr Phe Thr Lys Leu  
20 25 30

Asp Val Gly Thr Thr Thr Arg His Val Gly Cys Asp Gly Asn Gly Thr  
35 40 45

1028462\_1.TXT

Thr Leu Thr Ser Ile His Asp Asp Leu Gly Phe Ser Ile Val Val Phe  
50 55 60

Gly Ile Gln Asp Phe Val Arg Asn Thr Ser Cys Asn Gln Phe Leu Arg  
65 70 75 80

Asn Val Val Thr Ser Phe Asn Arg Tyr Cys Thr Asn Gln Asp Arg Leu  
85 90 95

Thr Leu Leu Val Thr Ser Leu Asn Val Phe Asp Asn Arg Phe Lys Leu  
100 105 110

Arg Phe Asp Thr Cys Ile Lys Lys Val  
115 120

<210> 281  
<211> 27  
<212> PRT  
<213> Streptococcus pneumoniae  
<400> 281

Ile Ser Thr Gly Val Pro Thr Cys Ser Met Tyr Pro Leu Leu Lys Thr  
1 5 10 15

Ala Ile Leu Ser Asp Lys Val Lys Ala Ser Ser  
20 25

<210> 282  
<211> 34  
<212> PRT  
<213> Streptococcus pneumoniae  
<400> 282

Leu Ser Thr Met Ser Ser Ile Lys Ser Ile Leu Cys Ser Leu Pro Thr  
1 5 10 15

His Thr Ile Phe Ser Lys Ser Ala Ile Ser Pro Lys Arg Gly Ser Thr  
20 25 30

Ala Ile

<210> 283  
<211> 111  
<212> PRT  
<213> Streptococcus pneumoniae  
<400> 283

Ser Cys Ser Tyr Ser Ser Thr Asn Ser Lys Ala Cys Ser Ile Val Gly  
1 5 10 15

1028462\_1.TXT

Leu Ser Lys Pro Thr Ile Phe Ile Cys Val Thr Pro Ile Ser Ala Ala  
20 25 30

Lys Ala Ile Ser Ser Ala Ser Arg Pro Ala Asn Ser Ser Thr Phe Lys  
35 40 45

Cys Val Cys Val Ser Lys Ile Ile Ser Ser Asn Leu Val Phe Tyr Leu  
50 55 60

Leu Leu Tyr Gln Lys Arg Gly Gly Ala Pro Asn Phe Ser Val Ser Pro  
65 70 75 80

Pro Leu Phe Asn Arg Glu Leu Phe Cys Tyr Leu Phe Tyr Pro Ile Leu  
85 90 95

Pro Ile Ser Tyr Ser Thr Val Arg Asp Arg Arg Asp Trp Leu His  
100 105 110

<210> 284  
<211> 110  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 284

Val Thr Ser Cys Ile Val Pro Ala Val Ala Cys Gly Ala Leu Val Val  
1 5 10 15

Leu Gly Ala Ala Leu Gly Ala Thr Gly Leu Leu Gly Thr Val Thr Met  
20 25 30

Ala Met Ala Cys Thr Pro Ile Val Ser Ala Ser Phe Thr Ser Ser Ile  
35 40 45

Val Phe Ala Phe Ser Ile Ser Leu Arg Ala Ala Cys Phe Ser Ala Ser  
50 55 60

Thr Leu Ala Lys Ser Ser Ala Phe Ser Leu Ser Glu Ser Gly Ala Pro  
65 70 75 80

Leu Ile Ser Ser Cys Leu Ser Leu Ala Ala Phe Ser Met Ala Phe Leu  
85 90 95

Ala Asp Ser Phe Ser Val Ala Asn Cys Leu Glu Ala Cys Asp  
100 105 110

<210> 285  
<211> 53

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 285

Tyr Ser Pro Phe Asn His Ser Ile Leu Ile Arg Lys Thr Thr Lys Ile  
 1 5 10 15

Ile Asn Pro Asn Pro Lys Ala Pro Arg Met Asn Trp Arg Ser Lys Val  
 20 25 30

Trp Ser Asn Gln Pro Val Asn Ile Ser Thr Asn His Thr Lys Ser Asp  
 35 40 45

Arg Pro Ile Lys Lys  
 50

&lt;210&gt; 286

&lt;211&gt; 48

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 286

Asp Tyr Phe Lys Phe Arg Thr Thr Phe Thr Arg Phe Ser Thr Val Lys  
 1 5 10 15

Pro Tyr Ser Ala Asn Thr Phe Gly Ala Gly Ala Glu Ala Pro Lys Val  
 20 25 30

Ser Ile Pro Arg Thr Ala Pro Ser Arg Pro Thr Tyr Leu Tyr Gln Phe  
 35 40 45

&lt;210&gt; 287

&lt;211&gt; 74

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 287

Arg Gly Arg Arg Gly Leu Cys Val Ala Arg Ile Lys Ala Pro Arg Leu  
 1 5 10 15

Val Ile Lys Pro Lys Arg Thr Ile Asp Pro Pro Thr Lys Asp Arg Tyr  
 20 25 30

Ser Pro Pro Leu Ser Ala Thr Ser Leu Ser Val Pro Lys Ser Pro Ile  
 35 40 45

Ile Ser Phe Pro Ala Lys Met Asp Lys Asn Pro Lys Arg Lys Leu Asn  
 50 55 60

Ser Lys Val Ile Phe Asn Ala Ser Val Thr  
65 70

<210> 288  
<211> 30  
<212> PRT  
<213> Streptococcus pneumoniae

<400> 288

Thr Pro Pro Tyr Thr Lys Ile Pro Ala Lys Thr Ala Ile Ile Pro Phe  
1 5 10 15

Ile Ser Ala Gln Asp Phe Asn Gln Ala Gln Arg Leu Ser Gly  
20 25 30

<210> 289  
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<212> DNA  
<213> Streptococcus pneumoniae

<400> 289

|            |            |            |             |            |            |      |
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| gttttaacaa | ctgcgcatgc | agaaacgact | gatgacaaaa  | ttgctgctca | agataataaa | 120  |
| attagtaact | taacagcaca | acaacaagaa | gcccaaaaac  | aagttgacca | aattcaggag | 180  |
| caagtatcag | ctattcaagc | tgagcagtct | aacttgcaag  | ctgaaaatga | tagattacaa | 240  |
| gcagaatcta | agaaactcga | gggtgagatt | acagaacttt  | ctaaaaacat | tgtttctcgt | 300  |
| aaccaatcgt | tggaaaaaca | agctcgtagt | gctcaaacaa  | atggagccgt | aactagctat | 360  |
| atcaatacca | ttgtaaactc | aaaatcaatt | acagaagcta  | tttcacgtgt | tgctgcaatg | 420  |
| agtgaatcgc | tatctgcaaa | caacaaaatg | ttagaacaac  | aaaaggcaga | taaaaaagct | 480  |
| atcttctgaa | aacaagtagc | aaataatgat | gctatcaata  | ctgtaattgc | taatcaacaa | 540  |
| aaattggctg | atgatgctca | agcattgact | acgaaacagg  | cagaactaaa | agctgctgaa | 600  |
| ttaagtcttg | ctgctgagaa | agcgacagct | gaaggggaaa  | aagcaagtct | attagagcaa | 660  |
| aaagcagcag | ctgaggcaga | ggctcgtgca | gctgcggtag  | cagaagcagc | ttataaagaa | 720  |
| aaacgagcta | gccaacaaca | atcagtactt | gcttcagcaa  | acactaactt | aacagctcaa | 780  |
| gtgcaagcag | tatctgaatc | tgacgacgca | cctgtccgtg  | caaaagttcg | tccaacatac | 840  |
| agtacaaacg | cttcaagtta | tccaattgga | gaatgtacat  | ggggagtaaa | aacattggca | 900  |
| ccttgggctg | gagactactg | gggtaatgga | gcacagtggg  | ctacaagtgc | agcagcagca | 960  |
| ggtttccgta | caggttcaac | acctcaagtt | ggagcaattg  | catgtttgga | tgatggtgga | 1020 |
| tatggtcacg | tagcggttgt | tacagctgtt | gaatcaacaa  | cacgtatcca | agtatcagaa | 1080 |
| tcaaattatg | caggtaatcg | tacaattgga | aatcacccgtg | gatggttcaa | tccaacaaca | 1140 |

actcctgaag gttttgttac atatatttat gcagat

1176

&lt;210&gt; 290

&lt;211&gt; 1176

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 290

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 attagtaact taacagcaca acaacaagaa gcccaaaaac aagttgacca aattcaggag 180  
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 aaacgagctg gccaacaaca atcagtactt gcttcagcaa acactaactt aacagctcaa 780  
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 tatggtcacg tagcggttgt tacagctgtt gaatcaacaa cacgtatcca agtatcagaa 1080  
 tcaaattatg caggtaatcg tacaattgga aatcacctg gatggttcaa tccaacaaca 1140  
 acttctgaag gttttgttac atatatttat gcagat 1176

&lt;210&gt; 291

&lt;211&gt; 1761

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 291

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1028462\_1.TXT

|             |            |            |            |            |            |      |
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| gaggaagacg  | gtcaacagta | cctagctatg | gagtatgtgg | ctggactgga | cctcaaacgc | 300  |
| tatatcaagg  | aacattatcc | tcttttcta  | gaagaagcag | cccgtatcat | gggacaaatt | 360  |
| ctcttggcta  | tgcgcttggc | ccatactcga | ggaattgttc | acagggactt | gaaacctcaa | 420  |
| aatatcctct  | tgacaccaga | tgggactgcc | aaggtcacag | actttgggat | tgctgtagcc | 480  |
| tttgcagaga  | caagtctgac | ccagactaac | tcgatgttgg | gctcagttca | ttacttgtca | 540  |
| ccagagcagg  | cgggtgggtc | gaaggcgact | gtgcagagtg | atatctatgc | catggggatt | 600  |
| atcttctatg  | agatgctgac | aggccatata | ccttatgacg | gggatagcgc | ggtgaccatt | 660  |
| gccctccagc  | atttccagaa | acccttgccg | tccgttattg | cagaaaatcc | atctgtacct | 720  |
| caggcttttag | aaaatgttat | tatcaaggca | actgctaaaa | agttgaccaa | tcgctaccgc | 780  |
| tcggtttcag  | agatgtatgt | ggacttgtct | agtagcttgt | cctacaatcg | tagaaatgaa | 840  |
| agtaagttaa  | tctttgatga | aacgagcaag | gcagatacca | agaccttgcc | gaaggtttct | 900  |
| cagagtacct  | tgacatctat | tcctaagggt | caagcgcaaa | cagaacacaa | atcaatcaaa | 960  |
| aaccaagcc   | aggctgtgac | agaggaaact | taccaaccac | aagcaccgaa | aaaacataga | 1020 |
| tttaagatgc  | gttacctgat | tttgttggcc | agccttgtat | tggtggcagc | ttctcttatt | 1080 |
| tggaacttat  | ccagaactcc | tgcaaccatt | gccattccag | atgtggcagg | tcagacagtt | 1140 |
| gcagaggcca  | aggcaacgct | caaaaaagcc | aattttgaga | ttggtgagga | gaagacagag | 1200 |
| gctagtgaaa  | aggtggaaga | agggcggatt | atccgtacag | atcctggcgc | tggaactggg | 1260 |
| cgaaaagaag  | gaacgaaaat | caattttggt | gtctcatcag | gcaagcaatc | tttccaaatt | 1320 |
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| ccagataatt  | tgattaaaat | tgaggaagaa | gagtcgaatg | agagtgaggc | tggaacggtc | 1440 |
| ctgaagcaaa  | gtctaccaga | aggtacgacc | tatgacttga | gcaaggcaac | tcaaattgtc | 1500 |
| ttgacagtag  | ctaaaaaagt | tacaagtgtt | gccatgccga | gttacattgg | ttctagcttg | 1560 |
| gagtttacta  | agaacaat   | gattcaaatt | gttgggatta | aggaagctaa | tatagaagtt | 1620 |
| gtagaagtga  | cgacagcgcc | tgcaaggtag | gcagaaggca | tggttggtga | acaaagtcct | 1680 |
| agagcaggtg  | aaaaggtaga | cctcaataag | actagagtca | agatttcaat | ctacaaacct | 1740 |
| aaaacaactt  | cagctactcc | t          |            |            |            | 1761 |

<210> 292  
 <211> 1977  
 <212> DNA  
 <213> Streptococcus pneumoniae

|            |             |
|------------|-------------|
| <400> 292  |             |
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| ttttgccgga | cgctatcgga  |
| ttgtcaaaca | gattgggtcga |
|            | 60          |
| ggaggcatgg | cggatgtcta  |
| cctagccaaa | gacttaatct  |
| tagatgggga | agaagtggca  |
|            | 120         |



## 1028462\_1.TXT

|             |            |             |             |            |             |      |
|-------------|------------|-------------|-------------|------------|-------------|------|
| gtgaagggttc | tgaggaccaa | ctaccagacg  | gacccgatag  | ctgtagctcg | ttttcagcgt  | 180  |
| gaagcgagag  | ctatggcaga | tctagaccat  | cctcatatcg  | ttcggataac | agatattggt  | 240  |
| gaggaagacg  | gtcaacagta | tcttgcaatg  | gagtatgttg  | ctggactaga | cctcaaacgc  | 300  |
| tatatcaagg  | aacattatcc | tctttctaata | gaagaagcag  | tccgtatcat | gggacaaatt  | 360  |
| ctcttggcta  | tgcgcttggc | ccatactcga  | ggaattgttc  | acagggactt | gaaacctcaa  | 420  |
| aatatccttt  | tgacaccaga | tgggacggcc  | aagggtcacag | actttgggat | tgctgtagcc  | 480  |
| tttgcagaga  | caagtctgac | ccagactaac  | tcgatgttgg  | gctcagttca | ttacttgtca  | 540  |
| ccagagcagg  | cgctgtggtc | gaaggcgact  | gtgcagagtg  | atatctatgc | catggggatt  | 600  |
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| gccctccagc  | atttccagaa | acccttgccg  | tccgttattg  | cagaaaatcc | atctgtacct  | 720  |
| caggcttttag | aaaatgttat | tatcaaggca  | actgctaaaa  | agttgaccaa | tcgctaccgc  | 780  |
| tcggtttcag  | agatgtatgt | ggacttgtct  | agtagcttgt  | cctacaatcg | tagaaatgaa  | 840  |
| agtaagttaa  | tctttgatga | aacgagcaag  | gcagatacca  | agaccttgcc | gaaggtttct  | 900  |
| cagagtacct  | tgacatctat | tcctaagggt  | caagcgcaga  | cagaacacaa | atcaatcaaa  | 960  |
| aaccaagcc   | aggctgtgac | agaggaaact  | taccaaccac  | aagcaccgaa | aaaacataga  | 1020 |
| tttaagatgc  | gttacctgat | tttgttggcc  | agccttgtat  | tggtggcagc | ttctcttatt  | 1080 |
| tgatactat   | ccagaactcc | tgcaaccatt  | gccattccag  | atgtggcagg | tcagacagtt  | 1140 |
| gcagaggcca  | aggcaacgct | caaaaaagcc  | aatttttgaga | ttggtgagga | gaagacagag  | 1200 |
| gctagtgaag  | aggtggaaga | agggcggatt  | atccgtacag  | atcctggcgc | tggaactggt  | 1260 |
| cgaaaagaag  | gaacgaaaat | caatttggtt  | gtctcatcag  | gcaaacaatc | cttccaaatt  | 1320 |
| agtaattatg  | tcggccggaa | atcttctgat  | gttatcgcgg  | aattaaaaga | gaaaaaagtt  | 1380 |
| ccagataatt  | tgattaaaat | tgaggaagaa  | gagtcgaatg  | agagtgaggc | tggaacggtc  | 1440 |
| ctgaagcaaa  | gtctaccaga | aggtagcacc  | tatgacttga  | gcaaggcaac | tcaaattggt  | 1500 |
| ttgacagtag  | ctaaaaaagc | tacgacgatt  | caattaggga  | actatattgg | acggaactct  | 1560 |
| acagaagtaa  | tctcagaact | caagcagaag  | aagggttcctg | agaatttgat | taagatagag  | 1620 |
| gaagaagagt  | ccagcgaaag | cgaaccagga  | acgattatga  | aacaaagtcc | aggtgccgga  | 1680 |
| acgacttatg  | atgtgagtaa | acctactcaa  | attgtcttga  | cagtagctaa | aaaagttaca  | 1740 |
| agtgttgcca  | tgccgagtta | cattgggttcc | agcttggagt  | ttactaagaa | caatttgatt  | 1800 |
| caaattgttg  | ggattaagga | agctaataata | gaagttgtag  | aagtgacgac | agcgcctgca  | 1860 |
| ggtagtgtag  | aaggcatggt | tgttgaacaa  | agtcctagag  | caggtgaaaa | ggtagacctta | 1920 |
| aataagacta  | gagtcaagat | ttcaatctac  | aaacctaata  | caacttcagc | tactcct     | 1977 |

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<210> 293  
 <211> 1977  
 <212> DNA  
 <213> Streptococcus pneumoniae

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gtgaagggttc tgaggaccaa ctaccagacg gacccgatag ctgtagctcg ttttcagcgt      180
gaagcgagag ctatggcaga tctagaccat cctcatatcg ttcggataac agatattggt      240
gaggaagacg gtcaacagta tcttgcaatg gagtatgttg ctggactaga cctcaaacgc      300
tatatcaagg aacattatcc tctttctaata gaagaagcag tccgtatcat gggacaaatc      360
ctcctagcca tgcgtttggc ccataccaga ggaattgttc acagggactt gaaacctcaa      420
aatatccttt tgacaccaga tgggactgcc aagggtcacag actttgggat tgctgtagcc      480
tttgacagaga caagtctgac ccagactaac tcgatgttgg gctcagttca ttacttgtcc      540
ccagagcagg cgcgtgggttc gaaggcgact gtgcagagtg atatctatgc tatggggatt      600
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gccctccagc atttccagaa acccctgccg tccgttattg cagaaaatcc atctgtacct      720
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cgaaaagaag gaacgaaaat caatctggtt gtctcatcag gcaaacaatc cttccaaatt     1320
agtaattatg tcggccggaa atcttctgat gttatcgcgg aattaaaaga gaaaaaagtt     1380
ccagataatt tgattaaaat tgaggaagaa gagtcgaatg agagtgaggc tggaacggtc     1440
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 ggtagtgcag aaggcatggt tgttgaacaa agtcctagag caggtgaaaa ggtagacctc 1920  
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<210> 294

<211> 1977

<212> DNA

<213> Streptococcus pneumoniae

<400> 294

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| ctgaagcaaa | gtctaccaga  | aggtacgacc | tatgacttga | gcaaggcaac | tcaaattatt | 1500 |
| ttgacagtag | ctaaaaaagc  | tacgacgatt | caattaggga | actatatggg | acggaactct | 1560 |
| acagaagtaa | tctcagaact  | caagcagaag | aaggttcctg | agaatttgat | taagatagag | 1620 |
| gaagaagagt | ccagcgaaaag | cgaaccagga | acgattatga | aacaaagtcc | aggtgccgga | 1680 |
| acgacttatg | atgtgagtaa  | acctactcaa | attgtcttga | cagtagctaa | aaaagttaca | 1740 |
| agtgttgcca | tgccgagtta  | cattggttcc | agcttgaggt | ttactaagaa | caatttgatt | 1800 |
| caaattgttg | ggattaagga  | agctaataa  | gaagttgtag | aagtgacgac | agcgcctgca | 1860 |
| ggtagtgag  | aaggcatggt  | tggtgaacaa | agtcctagag | caggtgaaaa | ggtagacctt | 1920 |
| aataagacta | gagtcaagat  | ttcaatctac | aaacctaata | caacttcagc | tactcct    | 1977 |

&lt;210&gt; 295

&lt;211&gt; 1980

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 295

|             |            |            |             |            |             |      |
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| ggaggcatgg  | cggatgtcta | cctagccaaa | gacttaatct  | tagatgggga | agaagtggca  | 120  |
| gtgaaggttc  | tgaggaccaa | ctaccagacg | gacccgatag  | ctgtagctcg | ttttcagcgt  | 180  |
| gaagcgagag  | ctatggcaga | tctagaccat | cctcatatcg  | ttcggataac | agatattggg  | 240  |
| gaggaagacg  | gtcaacagta | tcttgcaatg | gagtatgttg  | ctggactaga | cctcaaacgc  | 300  |
| tatatcaagg  | aacattatcc | tcttttcta  | gaagaagcag  | tccgtatcat | gggacaaatt  | 360  |
| ctcttggtta  | tgcgcttggc | ccatactcga | ggaattgttc  | acagggactt | gaaacctcaa  | 420  |
| aatatccttt  | tgacaccaga | tgggactgcc | aagggtcacag | actttgggat | tgctgtagcc  | 480  |
| tttgacagaga | caagtctgac | ccagactaac | tcgatgttgg  | gctcagttca | ttacttgtca  | 540  |
| ccagagcagg  | cgcgtgggtc | gaaggcgact | gtgcagagtg  | atatctatgc | catgggggatt | 600  |
| atcttctatg  | agatgttgac | aggccatata | ccttatgacg  | gggatagcgc | ggtgaccatt  | 660  |
| gccctccagc  | atttccagaa | ccccctgccg | tccgttattg  | cagaaaattc | atctgtacct  | 720  |
| caggcttttag | aaaatgttat | tatcaaggca | actgctaata  | agttgaccaa | tcgctatcgc  | 780  |
| tcggtttcag  | agatgtatgt | agacttgtct | agtagcttgt  | cctacaatcg | tagaaatgaa  | 840  |
| agtaagttaa  | tctttgatga | aacgagcaag | gcagatacca  | agaccttgcc | gaaggtttct  | 900  |
| cagagtacct  | tgacatctat | tcctaagggt | caagcgcaga  | cagaacacaa | atcaatcaaa  | 960  |
| aaccaagcc   | aggctgtgac | agaggaaact | taccaaccac  | aagcaccgaa | aaaacataga  | 1020 |
| tttaagatgc  | gttacctgat | tttgttggcc | agccttgtat  | tggtggcagc | ttctcttatt  | 1080 |

## 1028462\_1.TXT

|            |            |            |             |            |            |      |
|------------|------------|------------|-------------|------------|------------|------|
| tgataactat | ccagaactcc | tgcaaccatt | gccattccag  | atgtggcagg | tcagacagtt | 1140 |
| gcagaggcca | aggcaacgct | caaaaaagcc | aattttgaga  | ttggtgagga | gaagacagag | 1200 |
| gctagtgaaa | aggtggaaga | agggcggatt | atccgtacag  | atcctggcgc | tggaactggt | 1260 |
| cgaaaagaag | gaacgaaaat | taatctgggt | gtctcatcag  | gcaaacaatc | cttccaaatt | 1320 |
| agtaattatg | tcggccggaa | atcttctgat | gttatcgcg   | aattaaaaga | gaaaaaagtt | 1380 |
| ccagataatt | tgattaaaat | tgaggaagaa | gagtcgaatg  | aaagtgaggc | tggaacggtc | 1440 |
| ctgaagcaaa | gtctaccaga | aggtacgacc | tatgacttga  | gcaaggcaac | tcaaattggt | 1500 |
| ttgacagtag | ctaaaaagc  | tacgacgatt | caattaggga  | actatattgg | acggaactct | 1560 |
| acagaagtaa | tctcagaact | caagcagaag | aagggttcctg | agaatttgat | taagatagag | 1620 |
| gaagaagagt | ccagcgaaag | cgaaccagga | acgattatga  | aacaaagtcc | aggtgccgga | 1680 |
| acgacttatg | atgtgagtaa | acctactcaa | attgtcttga  | cagtagctaa | aaaagttaca | 1740 |
| agtgttgcca | tgccgagtta | cattggttcc | agcttgaggt  | ttactaagaa | caatttgatt | 1800 |
| caaattgttg | ggattaagga | agctaataa  | gaagttgtag  | aagtgacgac | agcgctgca  | 1860 |
| ggtagtgtag | aaggcatggt | tgttgaacaa | agtcctagag  | caggtgaaaa | ggtagacct  | 1920 |
| aataagacta | gagtcaagat | ttcaatctac | aaacctaata  | caacttcagc | tactccttaa | 1980 |

&lt;210&gt; 296

&lt;211&gt; 2106

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 296

|            |            |            |            |             |            |     |
|------------|------------|------------|------------|-------------|------------|-----|
| atgtttgcat | caaaaagcga | aagaaaagta | cattattcaa | ttcgtaaatt  | tagtattgga | 60  |
| gtagctagtg | tagctgttgc | cagtcttggt | atgggaagtg | tggttcattgc | gacagagaac | 120 |
| gagggaagta | cccaagcagc | cacttcttct | aatatggcaa | agacagaaca  | taggaaagct | 180 |
| gctaaacaag | tcgtcgatga | atatatagaa | aaaatgttga | gggagattca  | actagataga | 240 |
| agaaaacata | cccaaatgt  | cgccttaaac | ataaagttga | gcgcaattaa  | aacgaagtat | 300 |
| ttgcgtgaat | taaatgtttt | agaagagaag | tcgaaagatg | agttgccgct  | agaaataaaa | 360 |
| gcaaagttag | acgcagcttt | tgagaagttt | aaaaaagata | cattgaaacc  | aggagaaaag | 420 |
| gtagcagaag | ctaagaagaa | ggttgaagaa | gctaagaaaa | aagccgagga  | tcaaaaagaa | 480 |
| gaagatcgtc | gtaactaccc | aaccaatact | tacaaaacgc | ttgaacttga  | aattgctgag | 540 |
| ttcgatgtga | aagttaaaga | agcggagctt | gaactagtaa | aagaggaagc  | taaagaatct | 600 |
| cgaaacgagg | gcacaattaa | gcaagcaaaa | gagaaagttg | agagtaaaaa  | agctgaggct | 660 |
| acaaggttag | aaaacatcaa | gacagatcgt | aaaaaagcag | aagaagaagc  | taaacgaaaa | 720 |
| gcagatgcta | agttgaagga | agctaattga | gcgacttcag | atcaaggtaa  | accaaagggg | 780 |

## 1028462\_1.TXT

```

cgggcaaaac gaggagttcc tggagagcta gcaacacctg ataaaaaaga aaatgatgcg      840
aagtcttcag attctagcgt aggtgaagaa actcttccaa gctcatccct gaaatcagga      900
aaaaaggtag cagaagctga gaagaagggt gaagaagctg agaaaaaagc caaggatcaa      960
aaagaagaag atcgccgtaa ctaccaacc aatacttaca aaacgcttga ccttgaaatt     1020
gctgagtccg atgtgaaagt taaagaagcg gagcttgaac tagtaaaaga ggaagctaag     1080
gaacctcgag acgaggaaaa aattaagcaa gcaaaagcga aagttgagag taaaaaagct     1140
gaggctacaa ggttagaaaa catcaagaca gatcgtaaaa aagcagaaga agaagctaaa     1200
cgaaaagcag cagaagaaga taaagttaaa gaaaaaccag ctgaacaacc acaaccagcg     1260
ccggctactc aaccagaaaa accagctcca aaaccagaga agccagctga acaacaaaaa     1320
gcagaaaaaa cagatgatca acaagctgaa gaagactatg ctcgtagatc agaagaagaa     1380
tataatcgct tgactcaaca gcaaccgcca aaaactgaaa aaccagcaca accatctact     1440
ccaaaaacag gctggaaaca agaaaacggt atgtggtact tctacaatac tgatggttca     1500
atggcaacag gatggctcca aaacaacggt tcatggtact atctaaacgc taatggtgct     1560
atggcgacag gatggctcca aaacaatggt tcatggtact atctaaacgc taatggttca     1620
atggcaacag gatggctcca aaacaatggt tcatggtact acctaaacgc taatggtgct     1680
atggcgacag gatggctcca atacaatggt tcatggtact acctaaacag caatggcgct     1740
atggcgacag gatggctcca atacaatggc tcatggtact acctcaacgc taatggtgat     1800
atggcgacag gatggctcca aaacaacggt tcatggtact acctcaacgc taatggtgat     1860
atggcgacag gatggctcca atacaacggt tcatggtatt acctcaacgc taatggtgat     1920
atggcgacag gttgggtgaa agatggagat acctggtact atcttgaagc atcaggtgct     1980
atgaaagcaa gccaatggtt caaagtatca gataaatggt actatgtcaa tggctcaggt     2040
gcccttgcat tcaacacaac tgtagatggc tatggagtca atgccaatgg tgaatgggta     2100
aactaa                                           2106

```

```

<210> 297
<211> 1501
<212> DNA
<213> Streptococcus pneumoniae

<220>
<221> misc_feature
<222> (491)..(530)
<223> n represents undefined/missing nucleotides due to unavailable sequencing
information.

<400> 297
atgtttgcat caaaaagcga aagaaaagta cattattcaa ttcgtaaatt tagtgttgga      60
gtagctagtg tagttgttgc cagtcttggt atgggaagtg tggttcatgc gacagagaac     120

```

## 1028462\_1.TXT

```

gagggagcta cccaagtacc cacttcttct aatagggcaa atgaaagtca ggcagaacaa 180
ggagaacaac ctaaaaaact cgattcagaa cgagataagg caaggaaaga ggtcgaggaa 240
tatgtaaaaa aaatagtggg tgagagctat gcaaaatcaa ctaaaaagcg acatacaatt 300
actgtagctc tagttaacga gttgaacaac attaagaacg agtatttgaa taaaatagtt 360
gaatcaacct cagaaagcca actacagata ctgatgatgg agagtcgatc aaaagtagat 420
gaagctgtgt ctaagtttga aaaggactca ccttcttcgt caagttcaga ctcttccact 480
aaaccggaag nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn ttgctgagtc 540
cgatgtggaa gttaaaaaag cggagcttga actagtaaaa gaggaagcta aggaacctcg 600
aaacgaggaa aaagttaagc aagcaaaagc ggaagttgag agtaaaaaag ctgaggctac 660
aaggttagaa aaaatcaaga cagatcgtaa aaaagcagaa gaagaagcta aacgaaaagc 720
agcagaagaa gataaagtta aagaaaaacc agctgaacaa ccacaaccag cgccggctcc 780
aaaagcagaa aaaccagctc cagctccaaa accagagaat ccagctgaac aaccaaagc 840
agaaaaacca gctgatcaac aagctgaaga agactatgct cgtagatcag aagaagaata 900
taatcgcttg actcaacagc aaccgccaaa aactgaaaaa ccagcacaac catctactcc 960
aaaaacaggc tggaaacaag aaaacggtat gtggtacttc tacaatactg atggttcaat 1020
ggcgacagga tggctccaaa acaatggctc atggtactac ctcaacagca atggcgctat 1080
ggcgacagga tggctccaaa acaatggctc atggtactat ctaaacgcta atggttcaat 1140
ggcaacagga tggctccaaa acaatggctc atggtactac ctaaacgcta atggttcaat 1200
ggcgacagga tggctccaat acaatggctc atggtactac ctaaacgcta atggttcaat 1260
ggcgacagga tggctccaat acaatggctc atggtactac ctaaacgcta atggtgatat 1320
ggcgacaggt tgggtgaaag atggagatac ctggtactat cttgaagcat caggtgctat 1380
gaaagcaagc caatggttca aagtatcaga taaatggtac tatgtcaatg gctcaggtgc 1440
ccttgcagtc aacacaactg tagatggcta tggagtcaat gccaatggtg aatgggtaaa 1500
c 1501

```

&lt;210&gt; 298

&lt;211&gt; 845

&lt;212&gt; DNA

&lt;213&gt; Streptococcus pneumoniae

&lt;220&gt;

&lt;221&gt; misc\_feature

&lt;222&gt; (1)..(40)

&lt;223&gt; n represents undefined/missing nucleotides due to unavailable sequencing information.

&lt;400&gt; 298

```

nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn cttgaaattg ctgagtccga 60

```

## 1028462\_1.TXT

```

tgtggaagtt aaaaaagcgg agcttgacta gtaaagagga agctaagaag cctttaaacg 120
agggcacaat taggcaagca aaagcggaag ttgagagtaa aaaagctgag gctacaagggt 180
tagaaaaaat caagacagat cgtaaaaaag cagaagaaga agctaaacga agagcagcag 240
aagaagataa agttaaagaa aaaccagctg aacaaccaca accagcgccg gcccctcaac 300
cagaaaaacc aactgaagag cctgagaatc cagttccagc tccaaaacca gagaagccag 360
ctgaacaacc aaaaccagag aagccagctg aacaaccaa accagagaag ccagctgaac 420
aaccaaaagc agaaaaaaca gatgatcaac aagctgaaga agactatgct cgtagatcag 480
aagaagaata taatcgcttg actcaacagc aaccgcaaaa accagagcaa ccagctcctg 540
caccaaaaat aggctggaag caagaaaacg gtatgtggta cttctacaat actgatgggt 600
caatggcgac aggatggctc caatacaatg gctcatggta ttacctaac gctaacgggt 660
caatggcaac aggttgggtg aaagatggag atacctggta ctatcttgaa gcatcaggtg 720
ctatgaaagc aagccaatgg ttcaaagtat cagataaatg gtactatgtc aatggctcag 780
gtgcccttgc agtcaacaca actgtagatg gctatggagt caatgccaat ggtgaatggg 840
taaac 845

```

```

<210> 299
<211> 1843
<212> DNA
<213> Streptococcus pneumoniae

<220>
<221> misc_feature
<222> (757)..(796)
<223> n represents undefined/missing nucleotides due to unavailable sequencing
information.

```

```

<400> 299
atgtttgcat caaaaagcga aagaaaagta cattattcaa ttcgtaaatt tagtgttgga 60
gtagctagtg tagctgttgc cagtcttggt atgggaagtg tggttcatgc gacagagaac 120
gagagaacta cccaagtacc cacttcttct aataggggaa agccagaacg taggaaagct 180
gctgaacaat tcgatgaata tataaaca aa atgatccaat tagataaaag aaaacatacc 240
caaaatttag cttcaacat acagttgagc agaattaaaa cggagtatgt gaatggatta 300
aaagagaagt cggaagctga gttgccgtca aaaataaaaag cagagttaga cgcagctttt 360
aagcagttta aaaaagatac attaccaaca gaaccagaaa aaaaagtagc agaagctgag 420
aagaaggttg aagaagctga gaagaaggta gcagaagcta agaaaaaagc caaggctcaa 480
aaagaagaag atcaccgtaa ctaccaacc attacttaca aaacgcttga ccttgaaatt 540
gctgagttcg atgtgaaagt taaagaagcg gagcttgaac tagtaaaaaa ggaagctgac 600
gaatctcgaa acgagggcac aattaaccaa gcaaaagcga aagttgagag tgaaaaagct 660

```



## 1028462\_1.TXT

```

gaggctacaa ggttaaaaaa aatcaagaca gatcgtgaaa aagcagaaga agaagaagct 720
aaacgaagag cagatgctaa agagcaagat gaatcannnn nnnnnnnnnn nnnnnnnnnn 780
nnnnnnnnnn nnnnnnnattg ctgagtccga tgtgaaagtt aaagaagcgg agcttgaact 840
agtaaaagag gaagctaagg aatctcgaaa cgaggaaaaa attaagcaag caaaagcgaa 900
agttgagagt aaaaaagctg aggctacaag gttagaaaaa atcaagacag atcgtaaaaa 960
agcagaagaa gaagctaaac gaaaagcagc agaagaagat aaagttaaag aaaaaccagc 1020
tgaacaacca caaccagcgc cggctccaaa accagagaat ccagctgaag agcctgagaa 1080
tccagttcca gctccaaaac cagagaatcc agctgaacaa caaaagcag aaaaaccagc 1140
tgatcaacaa gctgaagaag actatgctcg tagatcagaa gaagaatata atcgcttgac 1200
tcaacagcaa cgcgcaaaac cagagcaacc agctcctgca caaaaaatag gctggaaaca 1260
agaaaacggt atgtggtact tctacaatac tgatggttca atggcgaccg gatggctcca 1320
aaacaatggc tcatggtact acctcaacag caatggcgct atggcgacag gatggctcca 1380
aaacaatggc tcatggtact atctaaacgc taatggttca atggcaacag gatggctcca 1440
aaacaatggc tcatggtact acctcaacgc taatggtgat atggcgacag gatggctcca 1500
atacaatggc tcatggtact acctcaacgc taatggtgat atggcgacag gatggctcca 1560
atacaatggc tcatggtact acctaaacgc taatggtgat atggcgacag gatggctcca 1620
atacaatggc tcatggtact atctaaacgc taatggtgat atggcgacag gttgggtgaa 1680
agatggagat acctggtact atcttgaagc atcaggtgct atgaaagcaa gccaatgggt 1740
caaagtatca gataaatggt actatgtcaa tggctcaggt gcccttgagc tcaacacaac 1800
tgtagacggc tatggagtca atgccaatgg tgaatgggta aac 1843

```

```

<210> 300
<211> 1654
<212> DNA
<213> Streptococcus pneumoniae

<220>
<221> misc_feature
<222> (682)..(721)
<223> n represents undefined/missing nucleotides due to unavailable sequencing
information.

```

```

<400> 300
atgtttgcat caaaaagcga aagaaaagta cattattcaa ttcgtaaatt tagtattgga 60
gtagctagtg tagctgttgc tagcttgttc ttaggaggag tagtccatgc agaagggggt 120
agaagtgaga ataccccaa ggttacatct agtggggatg aagtcgatga atatataaaa 180
aaaatgttga gtgagatcca attagataaa agaaaacata cccacaattt cgccttaaac 240
ctaaagttga gcagaattaa aacggagtat ttgtataaat taaaagttaa tgttttagaa 300

```

1028462\_1.TXT

|   |      |
|---|------|
| gaaaagtcaa aagctgagtt gacgtcaaaa acaaaaaaag aggtagacgc agcttttgag   | 360  |
| aagtttataaa aagatacatt gaaactagga gaaaaggtag cagaagcaca gaagaagggtt | 420  |
| gaagaagcta agaaaaaagc caaggatcaa aaagaagaag atcaccgtaa ctaccaacc    | 480  |
| aatacttaca aaacgcttga acttgaaatt gctgagtcg atgtgaaagt taaagaagcg    | 540  |
| gagcttgaac tattgaaaga ggaagctaaa actcgaaacg aggacacaat taaccaagca   | 600  |
| aaagcgaaag ttaagagtga acaagctgag gctacaaggt taaaaaaaat caagacagat   | 660  |
| cgtgaacaag ctgaggctac annnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn   | 720  |
| nattgctgag tccgatgtga aagttaaaga agcggagctt gaactagtaa aagaggaagc   | 780  |
| taaggaacct cgagacgagg aaaaaattaa gcaagcaaaa gcggaagttg agagtaaaca   | 840  |
| agctgaggct acaaggttag aaaaaatcaa gacagatcgt aaaaaagcag aagaagaagc   | 900  |
| taaacgaaaa gcagcagaag aagataaagt taaagaaaaa ccagctgaac aaccacaacc   | 960  |
| agcgccggct cctcaaccag aaaaaccaac tccaaaacca gaaaaaccag ctccagctcc   | 1020 |
| aaaaccagag aatccagctg aacaaccaa agcagaaaaa ccagctgac aacaagctga     | 1080 |
| agaagactat gctcgtagat cagaagaaga atataatcgc ttgactcaac agcaaccgcc   | 1140 |
| aaaaactgaa aaaccagcac aaccatctac tccaaaaaca ggctggaaac aagaaaacgg   | 1200 |
| tatgtggtac ttctacaata ctgatggttc aatggcgaca ggatggctcc aatacaatgg   | 1260 |
| ctcatggtac tacctaaacg ctaatggtga tatggcgaca ggatggctcc aaaacaatgg   | 1320 |
| ttcatggtac tacctaaacg ctaatggtga tatggcgaca ggatggctcc aaaacaatgg   | 1380 |
| ctcatggtac tacctaaacg ctaatggtga tatggcgaca ggatggctcc aaaacaatgg   | 1440 |
| ctcatggtac tacctaaacg ctaatggtga tatggcgaca ggatgggtga aagatggaga   | 1500 |
| tacctggtac tatcttgaag catcaggtgc tatgaaagca agccaatggt tcaaagcatc   | 1560 |
| agataaatgg tactatgtca atggctcagg tgcccttgca gtcaacacaa ctgtagatgg   | 1620 |
| ctatggagtc aatgccaatg gtgaatgggt aaac                               | 1654 |

<210> 301  
 <211> 1751  
 <212> DNA  
 <213> Streptococcus pneumoniae

<220>  
 <221> misc\_feature  
 <222> (722)..(761)  
 <223> n represents undefined/missing nucleotides due to unavailable sequencing information.

<400> 301  
 atgtttgcat caaaaagcga aagaaaagta cattattcaa ttcgtaaatt tagtattgga 60  
 gtagctagtg tagctgttgc cagtcttgtt atgggaagtg tggttcatgc gacagagaag 120

## 1028462\_1.TXT

|   |      |
|---|------|
| gaggtaacta cccaagtacc cacttattct aatatggcaa agacagaaca taggaaagct   | 180  |
| gctaaacaag tcgtcgatga atatatagaa aaaatgttga gggagattca attagataga   | 240  |
| agaaaacata cccaaaattht cgccttcaac atgaagttga gcgcaattaa aacggagtat  | 300  |
| ttgtatggat taaaagagaa gtcggaagct gagttgccgt catcggaagc tgagttgccg   | 360  |
| tcagaagtaa aagcaaagtt agacgcagct tttgagcagt ttaaaaaaga tacattgaaa   | 420  |
| ctaggagaaa aggtagcaga agctgagaag aaggttgacag aagctgagaa aaaagccaag  | 480  |
| gctcaaaaag aagaagatcg ccgtaactac ccaaccatta cttacaaaac gcttgacctt   | 540  |
| gaaattgctg agtccgatgt ggaagttaaa aaagcggagc ttgaactatt gaaagaggaa   | 600  |
| gctaaaactc gaaacaagga cacaattaag caagcaaaaag cgaaagttga gagtaaaaaa  | 660  |
| gctgaggcta caaagttaga agaaatcaag acagatcgta aaaaagcaga agaagaagct   | 720  |
| annnnnnnnn nnnnnnnnnn nnnnnnnnnn nnnnnnnnnn nattgctgag tccgatgtga   | 780  |
| aagttaaaga agcggagctt gaactagtaa aagaggaagc taaggaatct cgaaacgagg   | 840  |
| aaaaagttaa gcaagcaaaa gcgaaagttg agagtaaaaa agctgaggct acaaggttag   | 900  |
| aaaaaatcaa gacagatcgt aaaaaagcag aagaagctaa acgaagagca gcagaagaag   | 960  |
| ataaagttaa agaaaaacca gctgaacaac cacaaccagc gccggctcct caaccagaaa   | 1020 |
| aaccaactga agagcctgag aatccagctc cagctccaaa acctgagaaa ccagctgaac   | 1080 |
| aaccaaagc agaaaaacca gctgatcaac aagctgaaga agactatgct cgtagatcag    | 1140 |
| aagaagaata taatcgcttg actcaacagc aaccgccaaa aactgaaaaa ccagcacaac   | 1200 |
| catctactcc aaaaacaggc tggaaacaag aaaacggtat gtggtacttc tacaatactg   | 1260 |
| atggttcaat ggcgacagga tggctccaaa acaatggctc atggtactac ctcaacagca   | 1320 |
| atggcgctat ggcgacagga tggctccaat acaatggttc atggtactac ctcaacgcta   | 1380 |
| atggtgatat ggcgacagga tggctccaaa acaatggttc atggtactac ctcaacgcta   | 1440 |
| atggtgatat ggcgacagga tggctccaat acaatggttc atggtactac ctcaacgcta   | 1500 |
| atggtgatat ggcgacagga tggctccaaa acaatggctc atggtactac ctcaacgcta   | 1560 |
| atggtgatat ggcgacaggt tgggtgaaag atggagatac ctggtactat cttgaagcat   | 1620 |
| cagggtgctat gaaagcaagc caatggttca aagtatcaga taaatggtac tatgtcaatg  | 1680 |
| gctcagggtgc ccttgcagtc aacacaactg tagatggcta tggagtcaat gccaatgggtg | 1740 |
| aatgggtaac c  | 1751 |

<210> 302  
 <211> 1699  
 <212> DNA  
 <213> Streptococcus pneumoniae  
 <220>

&lt;221&gt; misc\_feature

&lt;222&gt; (742)..(781)

&lt;223&gt; n represents undefined/missing nucleotides due to unavailable sequencing information.

&lt;400&gt; 302

```

atgtttgcat caaaaagcga aagaaaagta cattattcaa ttcgtaaatt tagtattgga      60
gtagctagtg tagctgttgc tagcttggtc ttaggaggag tagtccatgc agaagggggt      120
agaagtgaga ataccccca ggttacatct agtggggatg aagtcgatga atatataaaa      180
aaaatgttga gtgagatcca attagataaa agaaaacata cccacaattht cgccttaaac      240
ctaaagttga gcagaattaa aacggagtat ttgtataaat taaaagttaa tgttttagaa      300
gaaaagtcaa aagctgagtt gacgtcaaaa acaaaaaaag aggtagacgc agcttttgag      360
aagtttaaaa aagatacatt gaaactagga gaaaaggtag cagaagctca gaagaagggt      420
gaagaagcta agaaaaaagc caaggatcaa aaagaagaag atcacgtaa ctaccaacc      480
aatacttaca aaacgcttga acttgaaatt gctgagtccg atgtgaaagt taaagaagcg      540
gagcttgaac tattgaaaga ggaagctaaa actcgaaacg aggacacaat taaccaagca      600
aaagcgaaag ttaagagtga acaagctgag gctacaagggt taaaaaaat caagacagat      660
cgtgaacaag ctgaggctac aaggttagaa aacatcaaga cagatcgtga aaaagcagaa      720
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1699

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Ala Glu Ser Lys Lys Leu Glu Gly Glu Ile Thr Glu Leu Ser Lys Asn  
85 90 95

Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln Ala Arg Ser Ala Gln  
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Thr Asn Gly Ala Val Thr Ser Tyr Ile Asn Thr Ile Val Asn Ser Lys  
115 120 125

Ser Ile Thr Glu Ala Ile Ser Arg Val Ala Ala Met Ser Glu Ile Val  
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Ile Ser Glu Lys Gln Val Ala Asn Asn Asp Ala Ile Asn Thr Val Ile  
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Leu Thr Ala Gln Val Gln Ala Val Ser Glu Ser Ala Ala Ala Pro Val  
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Arg Ala Lys Val Arg Pro Thr Tyr Ser Thr Asn Ala Ser Ser Tyr Pro  
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Ile Gly Glu Cys Thr Trp Gly Val Lys Thr Leu Ala Pro Trp Ala Gly  
290 295 300



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Asp Tyr Trp Gly Asn Gly Ala Gln Trp Ala Thr Ser Ala Ala Ala Ala  
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340 345 350

Thr Thr Arg Ile Gln Val Ser Glu Ser Asn Tyr Ala Gly Asn Arg Thr  
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 His Tyr Leu Ser Pro Glu Gln Ala Gly Gly Ser Lys Ala Thr Val Gln  
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 Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
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 His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
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 Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
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 Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
 260 265 270  
 Leu Ser Tyr Asn Arg Arg Asn Glu Ser Lys Leu Ile Phe Asp Glu Thr  
 275 280 285  
 Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
 290 295 300  
 Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
 305 310 315 320  
 Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
 325 330 335  
 Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
 340 345 350  
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 370 375 380

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Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

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225 230 235 240

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245 250 255

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Page 408

260 265 270  
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 Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
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 Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
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 115 120 125  
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 Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
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 His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
 180 185 190  
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 His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
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 275 280 285  
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 Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
 305 310 315 320

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 Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
 370 375 380  
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 385 390 395 400  
 Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
 405 410 415  
 Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
 420 425 430  
 Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
 435 440 445  
 Ser Asp Val Ile Ala Glu Leu Lys Glu Lys Lys Val Pro Asp Asn Leu  
 450 455 460  
 Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
 465 470 475 480  
 Leu Lys Gln Ser Leu Pro Glu Gly Thr Thr Tyr Asp Leu Ser Lys Ala  
 485 490 495  
 Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
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 Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
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Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
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595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

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Ala Thr Pro

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Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
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Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
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Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
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Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
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Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
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Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
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His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
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Gln Ala Leu Glu Asn Val Ile Ile Arg Ala Thr Ala Lys Lys Leu Thr  
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Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
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Leu Ser Tyr Asn Arg Arg Asn Glu Ser Lys Leu Ile Phe Asp Glu Thr  
275 280 285

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
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Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Gly His Lys Ser Ile Lys  
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Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
Page 414

370

375

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
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Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
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Ser Asp Val Ile Ala Glu Leu Lys Glu Lys Lys Val Pro Asp Asn Leu  
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Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
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Leu Lys Gln Ser Leu Pro Glu Gly Thr Thr Tyr Asp Leu Ser Lys Ala  
485 490 495

Thr Gln Ile Ile Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
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Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
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Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
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1028462\_1.TXT

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35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
 180 185 190  
 Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
 195 200 205  
 His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
 210 215 220  
 Phe Gln Asn Pro Leu Pro Ser Val Ile Ala Glu Asn Ser Ser Val Pro  
 225 230 235 240  
 Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
 245 250 255  
 Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
 260 265 270  
 Leu Ser Tyr Asn Arg Arg Asn Glu Ser Lys Leu Ile Phe Asp Glu Thr  
 275 280 285  
 Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
 290 295 300  
 Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
 305 310 315 320  
 Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
 325 330 335  
 Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
 340 345 350  
 Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
 355 360 365  
 Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
 370 375 380  
 Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
 385 390 395 400  
 Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
 405 410 415  
 Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
 420 425 430

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Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

Ser Asp Val Ile Ala Glu Leu Lys Glu Lys Lys Val Pro Asp Asn Leu  
450 455 460

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

Leu Lys Gln Ser Leu Pro Glu Gly Thr Thr Tyr Asp Leu Ser Lys Ala  
485 490 495

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

Thr Thr Tyr Asp Val Ser Lys Pro Thr Gln Ile Val Leu Thr Val Ala  
565 570 575

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 311  
<211> 701

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae

&lt;400&gt; 311

Met Phe Ala Ser Lys Ser Glu Arg Lys Val His Tyr Ser Ile Arg Lys  
 1 5 10 15

Phe Ser Ile Gly Val Ala Ser Val Ala Val Ala Ser Leu Val Met Gly  
 20 25 30

Ser Val Val His Ala Thr Glu Asn Glu Gly Ser Thr Gln Ala Ala Thr  
 35 40 45

Ser Ser Asn Met Ala Lys Thr Glu His Arg Lys Ala Ala Lys Gln Val  
 50 55 60

Val Asp Glu Tyr Ile Glu Lys Met Leu Arg Glu Ile Gln Leu Asp Arg  
 65 70 75 80

Arg Lys His Thr Gln Asn Val Ala Leu Asn Ile Lys Leu Ser Ala Ile  
 85 90 95

Lys Thr Lys Tyr Leu Arg Glu Leu Asn Val Leu Glu Glu Lys Ser Lys  
 100 105 110

Asp Glu Leu Pro Ser Glu Ile Lys Ala Lys Leu Asp Ala Ala Phe Glu  
 115 120 125

Lys Phe Lys Lys Asp Thr Leu Lys Pro Gly Glu Lys Val Ala Glu Ala  
 130 135 140

Lys Lys Lys Val Glu Glu Ala Lys Lys Lys Ala Glu Asp Gln Lys Glu  
 145 150 155 160

Glu Asp Arg Arg Asn Tyr Pro Thr Asn Thr Tyr Lys Thr Leu Glu Leu  
 165 170 175

Glu Ile Ala Glu Phe Asp Val Lys Val Lys Glu Ala Glu Leu Glu Leu  
 180 185 190

Val Lys Glu Glu Ala Lys Glu Ser Arg Asn Glu Gly Thr Ile Lys Gln  
 195 200 205

Ala Lys Glu Lys Val Glu Ser Lys Lys Ala Glu Ala Thr Arg Leu Glu  
 210 215 220

Asn Ile Lys Thr Asp Arg Lys Lys Ala Glu Glu Glu Ala Lys Arg Lys  
 225 230 235 240

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Ala Asp Ala Lys Leu Lys Glu Ala Asn Val Ala Thr Ser Asp Gln Gly  
245 250 255

Lys Pro Lys Gly Arg Ala Lys Arg Gly Val Pro Gly Glu Leu Ala Thr  
260 265 270

Pro Asp Lys Lys Glu Asn Asp Ala Lys Ser Ser Asp Ser Ser Val Gly  
275 280 285

Glu Glu Thr Leu Pro Ser Ser Ser Leu Lys Ser Gly Lys Lys Val Ala  
290 295 300

Glu Ala Glu Lys Lys Val Glu Glu Ala Glu Lys Lys Ala Lys Asp Gln  
305 310 315 320

Lys Glu Glu Asp Arg Arg Asn Tyr Pro Thr Asn Thr Tyr Lys Thr Leu  
325 330 335

Asp Leu Glu Ile Ala Glu Ser Asp Val Lys Val Lys Glu Ala Glu Leu  
340 345 350

Glu Leu Val Lys Glu Glu Ala Lys Glu Pro Arg Asp Glu Glu Lys Ile  
355 360 365

Lys Gln Ala Lys Ala Lys Val Glu Ser Lys Lys Ala Glu Ala Thr Arg  
370 375 380

Leu Glu Asn Ile Lys Thr Asp Arg Lys Lys Ala Glu Glu Glu Ala Lys  
385 390 395 400

Arg Lys Ala Ala Glu Glu Asp Lys Val Lys Glu Lys Pro Ala Glu Gln  
405 410 415

Pro Gln Pro Ala Pro Ala Thr Gln Pro Glu Lys Pro Ala Pro Lys Pro  
420 425 430

Glu Lys Pro Ala Glu Gln Pro Lys Ala Glu Lys Thr Asp Asp Gln Gln  
435 440 445

Ala Glu Glu Asp Tyr Ala Arg Arg Ser Glu Glu Glu Tyr Asn Arg Leu  
450 455 460

Thr Gln Gln Gln Pro Pro Lys Thr Glu Lys Pro Ala Gln Pro Ser Thr  
465 470 475 480

Pro Lys Thr Gly Trp Lys Gln Glu Asn Gly Met Trp Tyr Phe Tyr Asn  
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485

495

Thr Asp Gly Ser Met Ala Thr Gly Trp Leu Gln Asn Asn Gly Ser Trp  
500 505 510

Tyr Tyr Leu Asn Ala Asn Gly Ala Met Ala Thr Gly Trp Leu Gln Asn  
515 520 525

Asn Gly Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Ser Met Ala Thr Gly  
530 535 540

Trp Leu Gln Asn Asn Gly Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Ala  
545 550 555 560

Met Ala Thr Gly Trp Leu Gln Tyr Asn Gly Ser Trp Tyr Tyr Leu Asn  
565 570 575

Ser Asn Gly Ala Met Ala Thr Gly Trp Leu Gln Tyr Asn Gly Ser Trp  
580 585 590

Tyr Tyr Leu Asn Ala Asn Gly Asp Met Ala Thr Gly Trp Leu Gln Asn  
595 600 605

Asn Gly Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Asp Met Ala Thr Gly  
610 615 620

Trp Leu Gln Tyr Asn Gly Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Asp  
625 630 635 640

Met Ala Thr Gly Trp Val Lys Asp Gly Asp Thr Trp Tyr Tyr Leu Glu  
645 650 655

Ala Ser Gly Ala Met Lys Ala Ser Gln Trp Phe Lys Val Ser Asp Lys  
660 665 670

Trp Tyr Tyr Val Asn Gly Ser Gly Ala Leu Ala Val Asn Thr Thr Val  
675 680 685

Asp Gly Tyr Gly Val Asn Ala Asn Gly Glu Trp Val Asn  
690 695 700

<210> 312  
<211> 536  
<212> PRT  
<213> Streptococcus pneumoniae

<220>  
<221> MISC\_FEATURE  
<222> (164)..(213)

<223> xaa represents undefined/missing amino acids due to unavailable sequencing information.

<400> 312

Met Phe Ala Ser Lys Ser Glu Arg Lys Val His Tyr Ser Ile Arg Lys  
1 5 10 15

Phe Ser Val Gly Val Ala Ser Val Val Val Ala Ser Leu Val Met Gly  
20 25 30

Ser Val Val His Ala Thr Glu Asn Glu Gly Ala Thr Gln Val Pro Thr  
35 40 45

Ser Ser Asn Arg Ala Asn Glu Ser Gln Ala Glu Gln Gly Glu Gln Pro  
50 55 60

Lys Lys Leu Asp Ser Glu Arg Asp Lys Ala Arg Lys Glu Val Glu Glu  
65 70 75 80

Tyr Val Lys Lys Ile Val Gly Glu Ser Tyr Ala Lys Ser Thr Lys Lys  
85 90 95

Arg His Thr Ile Thr Val Ala Leu Val Asn Glu Leu Asn Asn Ile Lys  
100 105 110

Asn Glu Tyr Leu Asn Lys Ile Val Glu Ser Thr Ser Glu Ser Gln Leu  
115 120 125

Gln Ile Leu Met Met Glu Ser Arg Ser Lys Val Asp Glu Ala Val Ser  
130 135 140

Lys Phe Glu Lys Asp Ser Pro Ser Ser Ser Ser Ser Asp Ser Ser Thr  
145 150 155 160

Lys Pro Glu Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
165 170 175

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
180 185 190

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
195 200 205

Xaa Xaa Xaa Xaa Xaa Ala Glu Ser Asp Val Glu Val Lys Lys Ala Glu  
210 215 220

Leu Glu Leu Val Lys Glu Glu Ala Lys Glu Pro Arg Asn Glu Glu Lys  
225 230 235 240

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Val Lys Gln Ala Lys 245 Ala Glu Val Glu Ser 250 Lys Lys Ala Glu Ala Thr 255

Arg Leu Glu Lys 260 Ile Lys Thr Asp Arg 265 Lys Lys Ala Glu Glu Glu Ala 270

Lys Arg Lys 275 Ala Ala Glu Glu Asp 280 Lys Val Lys Glu Lys 285 Pro Ala Glu

Gln Pro Gln Pro Ala Pro Ala 295 Pro Lys Ala Glu Lys 300 Pro Ala Pro Ala

Pro 305 Lys Pro Glu Asn 310 Pro Ala Glu Gln Pro Lys 315 Ala Glu Lys Pro Ala 320

Asp Gln Gln Ala Glu 325 Glu Asp Tyr Ala Arg 330 Arg Ser Glu Glu Glu Tyr 335

Asn Arg Leu Thr 340 Gln Gln Gln Pro Pro 345 Lys Thr Glu Lys Pro 350 Ala Gln

Pro Ser Thr 355 Pro Lys Thr Gly Trp 360 Lys Gln Glu Asn Gly 365 Met Trp Tyr

Phe Tyr 370 Asn Thr Asp Gly Ser 375 Met Ala Thr Gly Trp 380 Leu Gln Asn Asn

Gly 385 Ser Trp Tyr Tyr Leu 390 Asn Ser Asn Gly Ala 395 Met Ala Thr Gly Trp 400

Leu Gln Asn Asn Gly 405 Ser Trp Tyr Tyr Leu 410 Asn Ala Asn Gly Ser 415 Met

Ala Thr Gly Trp 420 Leu Gln Asn Asn Gly 425 Ser Trp Tyr Tyr Leu 430 Asn Ala

Asn Gly Ser 435 Met Ala Thr Gly Trp 440 Leu Gln Tyr Asn Gly 445 Ser Trp Tyr

Tyr Leu 450 Asn Ala Asn Gly Ser 455 Met Ala Thr Gly Trp 460 Leu Gln Tyr Asn

Gly 465 Ser Trp Tyr Tyr Leu 470 Asn Ala Asn Gly Asp 475 Met Ala Thr Gly Trp 480

Val Lys Asp Gly Asp Thr Trp Tyr Tyr Leu Glu Ala Ser Gly Ala Met

Lys Ala Ser Gln Trp Phe Lys Val Ser Asp Lys Trp Tyr Tyr Val Asn  
500 505 510

Gly Ser Gly Ala Leu Ala Val Asn Thr Thr Val Asp Gly Tyr Gly Val  
515 520 525

Asn Ala Asn Gly Glu Trp Val Asn  
530 535

<210> 313  
<211> 319  
<212> PRT  
<213> Streptococcus pneumoniae

<220>  
<221> MISC\_FEATURE  
<222> (1)..(51)  
<223> Xaa represents undefined/missing amino acids due to un available sequencing information.

<400> 313

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
20 25 30

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
35 40 45

Xaa Xaa Xaa Leu Lys Leu Leu Ser Pro Met Trp Lys Leu Lys Lys Arg  
50 55 60

Ser Leu Thr Ser Lys Glu Glu Ala Lys Lys Pro Leu Asn Glu Gly Thr  
65 70 75 80

Ile Arg Gln Ala Lys Ala Glu Val Glu Ser Lys Lys Ala Glu Ala Thr  
85 90 95

Arg Leu Glu Lys Ile Lys Thr Asp Arg Lys Lys Ala Glu Glu Glu Ala  
100 105 110

Lys Arg Arg Ala Ala Glu Glu Asp Lys Val Lys Glu Lys Pro Ala Glu  
115 120 125

Gln Pro Gln Pro Ala Pro Ala Pro Gln Pro Glu Lys Pro Thr Glu Glu  
130 135 140

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Pro Glu Asn Pro Val Pro Ala Pro Lys Pro Glu Lys Pro Ala Glu Gln  
145 150 155 160

Pro Lys Pro Glu Lys Pro Ala Glu Gln Pro Lys Pro Glu Lys Pro Ala  
165 170 175

Glu Gln Pro Lys Ala Glu Lys Thr Asp Asp Gln Gln Ala Glu Glu Asp  
180 185 190

Tyr Ala Arg Arg Ser Glu Glu Glu Tyr Asn Arg Leu Thr Gln Gln Gln  
195 200 205

Pro Gln Lys Pro Glu Gln Pro Ala Pro Ala Pro Lys Ile Gly Trp Lys  
210 215 220

Gln Glu Asn Gly Met Trp Tyr Phe Tyr Asn Thr Asp Gly Ser Met Ala  
225 230 235 240

Thr Gly Trp Leu Gln Tyr Asn Gly Ser Trp Tyr Tyr Leu Asn Ala Asn  
245 250 255

Gly Ser Met Ala Thr Gly Trp Val Lys Asp Gly Asp Thr Trp Tyr Tyr  
260 265 270

Leu Glu Ala Ser Gly Ala Met Lys Ala Ser Gln Trp Phe Lys Val Ser  
275 280 285

Asp Lys Trp Tyr Tyr Val Asn Gly Ser Gly Ala Leu Ala Val Asn Thr  
290 295 300

Thr Val Asp Gly Tyr Gly Val Asn Ala Asn Gly Glu Trp Val Asn  
305 310 315

<210> 314  
<211> 631  
<212> PRT  
<213> Streptococcus pneumoniae

<220>  
<221> MISC\_FEATURE  
<222> (253)..(302)  
<223> xaa represents undefined/missing amino acids due to unavailable sequencing information.

<400> 314

Met Phe Ala Ser Lys Ser Glu Arg Lys Val His Tyr Ser Ile Arg Lys  
1 5 10 15

Phe Ser Val Gly Val Ala Ser Val Ala Val Ala Ser Leu Val Met Gly  
Page 425

20

25

30

Ser Val Val His Ala Thr Glu Asn Glu Arg Thr Thr Gln Val Pro Thr  
 35 40 45

Ser Ser Asn Arg Gly Lys Pro Glu Arg Arg Lys Ala Ala Glu Gln Phe  
 50 55 60

Asp Glu Tyr Ile Asn Lys Met Ile Gln Leu Asp Lys Arg Lys His Thr  
 65 70 75 80

Gln Asn Leu Ala Phe Asn Ile Gln Leu Ser Arg Ile Lys Thr Glu Tyr  
 85 90 95

Leu Asn Gly Leu Lys Glu Lys Ser Glu Ala Glu Leu Pro Ser Lys Ile  
 100 105 110

Lys Ala Glu Leu Asp Ala Ala Phe Lys Gln Phe Lys Lys Asp Thr Leu  
 115 120 125

Pro Thr Glu Pro Glu Lys Lys Val Ala Glu Ala Glu Lys Lys Val Glu  
 130 135 140

Glu Ala Glu Lys Lys Val Ala Glu Ala Lys Lys Lys Ala Lys Ala Gln  
 145 150 155 160

Lys Glu Glu Asp His Arg Asn Tyr Pro Thr Ile Thr Tyr Lys Thr Leu  
 165 170 175

Asp Leu Glu Ile Ala Glu Phe Asp Val Lys Val Lys Glu Ala Glu Leu  
 180 185 190

Glu Leu Val Lys Lys Glu Ala Asp Glu Ser Arg Asn Glu Gly Thr Ile  
 195 200 205

Asn Gln Ala Lys Ala Lys Val Glu Ser Glu Lys Ala Glu Ala Thr Arg  
 210 215 220

Leu Lys Lys Ile Lys Thr Asp Arg Glu Lys Ala Glu Glu Glu Glu Ala  
 225 230 235 240

Lys Arg Arg Ala Asp Ala Lys Glu Gln Asp Glu Ser Xaa Xaa Xaa Xaa  
 245 250 255

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 260 265 270

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Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 275 280 285

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Ile Ala  
 290 295 300

Glu Ser Asp Val Lys Val Lys Glu Ala Glu Leu Glu Leu Val Lys Glu  
 305 310 315 320

Glu Ala Lys Glu Ser Arg Asn Glu Glu Lys Ile Lys Gln Ala Lys Ala  
 325 330 335

Lys Val Glu Ser Lys Lys Ala Glu Ala Thr Arg Leu Glu Lys Ile Lys  
 340 345 350

Thr Asp Arg Lys Lys Ala Glu Glu Glu Ala Lys Arg Lys Ala Ala Glu  
 355 360 365

Glu Asp Lys Val Lys Glu Lys Pro Ala Glu Gln Pro Gln Pro Ala Pro  
 370 375 380

Ala Pro Lys Pro Glu Asn Pro Ala Glu Glu Pro Glu Asn Pro Val Pro  
 385 390 395 400

Ala Pro Lys Pro Glu Asn Pro Ala Glu Gln Pro Lys Ala Glu Lys Pro  
 405 410 415

Ala Asp Gln Gln Ala Glu Glu Asp Tyr Ala Arg Arg Ser Glu Glu Glu  
 420 425 430

Tyr Asn Arg Leu Thr Gln Gln Gln Pro Pro Lys Pro Glu Gln Pro Ala  
 435 440 445

Pro Ala Pro Lys Ile Gly Trp Lys Gln Glu Asn Gly Met Trp Tyr Phe  
 450 455 460

Tyr Asn Thr Asp Gly Ser Met Ala Thr Gly Trp Leu Gln Asn Asn Gly  
 465 470 475 480

Ser Trp Tyr Tyr Leu Asn Ser Asn Gly Ala Met Ala Thr Gly Trp Leu  
 485 490 495

Gln Asn Asn Gly Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Asp Met Ala  
 500 505 510

Thr Gly Trp Leu Gln Tyr Asn Gly Ser Trp Tyr Tyr Leu Asn Ala Asn  
 515 520 525

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Gly Asp Met Ala Thr Gly Trp Leu Gln Tyr Asn Gly Ser Trp Tyr Tyr  
530 535 540

Leu Asn Ala Asn Gly Asp Met Ala Thr Gly Trp Leu Gln Tyr Asn Gly  
545 550 555 560

Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Asp Met Ala Thr Gly Trp Val  
565 570 575

Lys Asp Gly Asp Thr Trp Tyr Tyr Leu Glu Ala Ser Gly Ala Met Lys  
580 585 590

Ala Ser Gln Trp Phe Lys Val Ser Asp Lys Trp Tyr Tyr Val Asn Gly  
595 600 605

Ser Gly Ala Leu Ala Val Asn Thr Thr Val Asp Gly Tyr Gly Val Asn  
610 615 620

Ala Asn Gly Glu Trp Val Asn  
625 630

<210> 315  
<211> 588  
<212> PRT  
<213> Streptococcus pneumoniae

<220>  
<221> MISC\_FEATURE  
<222> (228)..(277)  
<223> Xaa represents undefined/missing amino acids due to unavailable sequencing information.

<400> 315

Met Phe Ala Ser Lys Ser Glu Arg Lys Val His Tyr Ser Ile Arg Lys  
1 5 10 15

Phe Ser Ile Gly Val Ala Ser Val Ala Val Ala Ser Leu Phe Leu Gly  
20 25 30

Gly Val Val His Ala Glu Gly Val Arg Ser Glu Asn Thr Pro Lys Val  
35 40 45

Thr Ser Ser Gly Asp Glu Val Asp Glu Tyr Ile Lys Lys Met Leu Ser  
50 55 60

Glu Ile Gln Leu Asp Lys Arg Lys His Thr His Asn Phe Ala Leu Asn  
65 70 75 80

Leu Lys Leu Ser Arg Ile Lys Thr Glu Tyr Leu Tyr Lys Leu Lys Val  
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Asn Val Leu Glu Glu Lys Ser Lys Ala Glu Leu Thr Ser Lys Thr Lys  
100 105 110

Lys Glu Val Asp Ala Ala Phe Glu Lys Phe Lys Lys Asp Thr Leu Lys  
115 120 125

Leu Gly Glu Lys Val Ala Glu Ala Gln Lys Lys Val Glu Glu Ala Lys  
130 135 140

Lys Lys Ala Lys Asp Gln Lys Glu Glu Asp His Arg Asn Tyr Pro Thr  
145 150 155 160

Asn Thr Tyr Lys Thr Leu Glu Leu Glu Ile Ala Glu Ser Asp Val Lys  
165 170 175

Val Lys Glu Ala Glu Leu Glu Leu Leu Lys Glu Glu Ala Lys Thr Arg  
180 185 190

Asn Glu Asp Thr Ile Asn Gln Ala Lys Ala Lys Val Lys Ser Glu Gln  
195 200 205

Ala Glu Ala Thr Arg Leu Lys Lys Ile Lys Thr Asp Arg Glu Gln Ala  
210 215 220

Glu Ala Thr Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
225 230 235 240

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
245 250 255

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
260 265 270

Xaa Xaa Xaa Xaa Xaa Ile Ala Glu Ser Asp Val Lys Val Lys Glu Ala  
275 280 285

Glu Leu Glu Leu Val Lys Glu Glu Ala Lys Glu Pro Arg Asp Glu Glu  
290 295 300

Lys Ile Lys Gln Ala Lys Ala Glu Val Glu Ser Lys Gln Ala Glu Ala  
305 310 315 320

Thr Arg Leu Glu Lys Ile Lys Thr Asp Arg Lys Lys Ala Glu Glu Glu  
325 330 335

Ala Lys Arg Lys Ala Ala Glu Glu Asp Lys Val Lys Glu Lys Pro Ala  
 340 345 350  
 Glu Gln Pro Gln Pro Ala Pro Ala Pro Gln Pro Glu Lys Pro Thr Pro  
 355 360 365  
 Lys Pro Glu Lys Pro Ala Pro Ala Pro Lys Pro Glu Asn Pro Ala Glu  
 370 375 380  
 Gln Pro Lys Ala Glu Lys Pro Ala Asp Gln Gln Ala Glu Glu Asp Tyr  
 385 390 395 400  
 Ala Arg Arg Ser Glu Glu Glu Tyr Asn Arg Leu Thr Gln Gln Gln Pro  
 405 410 415  
 Pro Lys Thr Glu Lys Pro Ala Gln Pro Ser Thr Pro Lys Thr Gly Trp  
 420 425 430  
 Lys Gln Glu Asn Gly Met Trp Tyr Phe Tyr Asn Thr Asp Gly Ser Met  
 435 440 445  
 Ala Thr Gly Trp Leu Gln Tyr Asn Gly Ser Trp Tyr Tyr Leu Asn Ala  
 450 455 460  
 Asn Gly Asp Met Ala Thr Gly Trp Leu Gln Asn Asn Gly Ser Trp Tyr  
 465 470 475 480  
 Tyr Leu Asn Ala Asn Gly Asp Met Ala Thr Gly Trp Leu Gln Asn Asn  
 485 490 495  
 Gly Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Asp Met Ala Thr Gly Trp  
 500 505 510  
 Leu Gln Asn Asn Gly Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Asp Met  
 515 520 525  
 Ala Thr Gly Trp Val Lys Asp Gly Asp Thr Trp Tyr Tyr Leu Glu Ala  
 530 535 540  
 Ser Gly Ala Met Lys Ala Ser Gln Trp Phe Lys Ala Ser Asp Lys Trp  
 545 550 555 560  
 Tyr Tyr Val Asn Gly Ser Gly Ala Leu Ala Val Asn Thr Thr Val Asp  
 565 570 575  
 Gly Tyr Gly Val Asn Ala Asn Gly Glu Trp Val Asn  
 580 585

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<210> 316  
 <211> 620  
 <212> PRT  
 <213> Streptococcus pneumoniae  
 <220>  
 <221> MISC\_FEATURE  
 <222> (241)..(290)  
 <223> xaa represents undefined/missing amino acids due to unavailable sequencing information.

<400> 316

Met Phe Ala Ser Lys Ser Glu Arg Lys Val His Tyr Ser Ile Arg Lys  
 1 5 10 15

Phe Ser Ile Gly Val Ala Ser Val Ala Val Ala Ser Leu Val Met Gly  
 20 25 30

Ser Val Val His Ala Thr Glu Lys Glu Val Thr Thr Gln Val Pro Thr  
 35 40 45

Tyr Ser Asn Met Ala Lys Thr Glu His Arg Lys Ala Ala Lys Gln Val  
 50 55 60

Val Asp Glu Tyr Ile Glu Lys Met Leu Arg Glu Ile Gln Leu Asp Arg  
 65 70 75 80

Arg Lys His Thr Gln Asn Phe Ala Phe Asn Met Lys Leu Ser Ala Ile  
 85 90 95

Lys Thr Glu Tyr Leu Tyr Gly Leu Lys Glu Lys Ser Glu Ala Glu Leu  
 100 105 110

Pro Ser Ser Glu Ala Glu Leu Pro Ser Glu Val Lys Ala Lys Leu Asp  
 115 120 125

Ala Ala Phe Glu Gln Phe Lys Lys Asp Thr Leu Lys Leu Gly Glu Lys  
 130 135 140

Val Ala Glu Ala Glu Lys Lys Val Ala Glu Ala Glu Lys Lys Ala Lys  
 145 150 155 160

Ala Gln Lys Glu Glu Asp Arg Arg Asn Tyr Pro Thr Ile Thr Tyr Lys  
 165 170 175

Thr Leu Asp Leu Glu Ile Ala Glu Ser Asp Val Glu Val Lys Lys Ala  
 180 185 190

Glu Leu Glu Leu Leu Lys Glu Glu Ala Lys Thr Arg Asn Lys Asp Thr  
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|            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Ile        | Lys<br>210 | Gln        | Ala        | Lys        | Ala        | Lys<br>215 | Val        | Glu        | Ser        | Lys        | Lys<br>220 | Ala        | Glu        | Ala        | Thr        |
| Lys<br>225 | Leu        | Glu        | Glu        | Ile        | Lys<br>230 | Thr        | Asp        | Arg        | Lys        | Lys<br>235 | Ala        | Glu        | Glu        | Glu        | Ala<br>240 |
| Xaa        | Xaa        | Xaa        | Xaa        | Xaa<br>245 | Xaa        | Xaa        | Xaa        | Xaa        | Xaa<br>250 | Xaa        | Xaa        | Xaa        | Xaa        | Xaa<br>255 | Xaa        |
| Xaa        | Xaa        | Xaa        | Xaa<br>260 | Xaa        | Xaa        | Xaa        | Xaa        | Xaa<br>265 | Xaa        | Xaa        | Xaa        | Xaa        | Xaa<br>270 | Xaa        | Xaa        |
| Xaa        | Xaa        | Xaa<br>275 | Xaa        | Xaa        | Xaa        | Xaa        | Xaa<br>280 | Xaa        | Xaa        | Xaa        | Xaa        | Xaa<br>285 | Xaa        | Xaa        | Xaa        |
| Xaa        | Xaa<br>290 | Ile        | Ala        | Glu        | Ser        | Asp<br>295 | Val        | Lys        | Val        | Lys        | Glu<br>300 | Ala        | Glu        | Leu        | Glu        |
| Leu<br>305 | Val        | Lys        | Glu        | Glu        | Ala<br>310 | Lys        | Glu        | Ser        | Arg        | Asn<br>315 | Glu        | Glu        | Lys        | Val        | Lys<br>320 |
| Gln        | Ala        | Lys        | Ala        | Lys<br>325 | Val        | Glu        | Ser        | Lys        | Lys<br>330 | Ala        | Glu        | Ala        | Thr        | Arg<br>335 | Leu        |
| Glu        | Lys        | Ile        | Lys<br>340 | Thr        | Asp        | Arg        | Lys        | Lys<br>345 | Ala        | Glu        | Glu        | Ala        | Lys<br>350 | Arg        | Arg        |
| Ala        | Ala        | Glu<br>355 | Glu        | Asp        | Lys        | Val        | Lys<br>360 | Glu        | Lys        | Pro        | Ala        | Glu<br>365 | Gln        | Pro        | Gln        |
| Pro        | Ala<br>370 | Pro        | Ala        | Pro        | Gln        | Pro<br>375 | Glu        | Lys        | Pro        | Thr        | Glu<br>380 | Glu        | Pro        | Glu        | Asn        |
| Pro<br>385 | Ala        | Pro        | Ala        | Pro        | Lys<br>390 | Pro        | Glu        | Lys        | Pro        | Ala<br>395 | Glu        | Gln        | Pro        | Lys        | Ala<br>400 |
| Glu        | Lys        | Pro        | Ala        | Asp<br>405 | Gln        | Gln        | Ala        | Glu        | Glu<br>410 | Asp        | Tyr        | Ala        | Arg        | Arg<br>415 | Ser        |
| Glu        | Glu        | Glu        | Tyr<br>420 | Asn        | Arg        | Leu        | Thr        | Gln<br>425 | Gln        | Gln        | Pro        | Pro        | Lys<br>430 | Thr        | Glu        |
| Lys        | Pro        | Ala<br>435 | Gln        | Pro        | Ser        | Thr        | Pro<br>440 | Lys        | Thr        | Gly        | Trp        | Lys<br>445 | Gln        | Glu        | Asn        |

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Gly Met Trp Tyr Phe Tyr Asn Thr Asp Gly Ser Met Ala Thr Gly Trp  
450 455 460

Leu Gln Asn Asn Gly Ser Trp Tyr Tyr Leu Asn Ser Asn Gly Ala Met  
465 470 475 480

Ala Thr Gly Trp Leu Gln Tyr Asn Gly Ser Trp Tyr Tyr Leu Asn Ala  
485 490 495

Asn Gly Asp Met Ala Thr Gly Trp Leu Gln Asn Asn Gly Ser Trp Tyr  
500 505 510

Tyr Leu Asn Ala Asn Gly Asp Met Ala Thr Gly Trp Leu Gln Tyr Asn  
515 520 525

Gly Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Asp Met Ala Thr Gly Trp  
530 535 540

Leu Gln Asn Asn Gly Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Asp Met  
545 550 555 560

Ala Thr Gly Trp Val Lys Asp Gly Asp Thr Trp Tyr Tyr Leu Glu Ala  
565 570 575

Ser Gly Ala Met Lys Ala Ser Gln Trp Phe Lys Val Ser Asp Lys Trp  
580 585 590

Tyr Tyr Val Asn Gly Ser Gly Ala Leu Ala Val Asn Thr Thr Val Asp  
595 600 605

Gly Tyr Gly Val Asn Ala Asn Gly Glu Trp Val Asn  
610 615 620

<210> 317

<211> 603

<212> PRT

<213> Streptococcus pneumoniae

<220>

<221> MISC\_FEATURE

<222> (248)..(297)

<223> Xaa represents undefined/missing amino acids due to unavailable sequencing information.

<400> 317

Met Phe Ala Ser Lys Ser Glu Arg Lys Val His Tyr Ser Ile Arg Lys  
1 5 10 15

Phe Ser Ile Gly Val Ala Ser Val Ala Val Ala Ser Leu Phe Leu Gly  
20 25 30

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Gly Val Val His Ala Glu Gly Val Arg Ser Glu Asn Thr Pro Lys Val  
35 40 45

Thr Ser Ser Gly Asp Glu Val Asp Glu Tyr Ile Lys Lys Met Leu Ser  
50 55 60

Glu Ile Gln Leu Asp Lys Arg Lys His Thr His Asn Phe Ala Leu Asn  
65 70 75 80

Leu Lys Leu Ser Arg Ile Lys Thr Glu Tyr Leu Tyr Lys Leu Lys Val  
85 90 95

Asn Val Leu Glu Glu Lys Ser Lys Ala Glu Leu Thr Ser Lys Thr Lys  
100 105 110

Lys Glu Val Asp Ala Ala Phe Glu Lys Phe Lys Lys Asp Thr Leu Lys  
115 120 125

Leu Gly Glu Lys Val Ala Glu Ala Gln Lys Lys Val Glu Glu Ala Lys  
130 135 140

Lys Lys Ala Lys Asp Gln Lys Glu Glu Asp His Arg Asn Tyr Pro Thr  
145 150 155 160

Asn Thr Tyr Lys Thr Leu Glu Leu Glu Ile Ala Glu Ser Asp Val Lys  
165 170 175

Val Lys Glu Ala Glu Leu Glu Leu Leu Lys Glu Glu Ala Lys Thr Arg  
180 185 190

Asn Glu Asp Thr Ile Asn Gln Ala Lys Ala Lys Val Lys Ser Glu Gln  
195 200 205

Ala Glu Ala Thr Arg Leu Lys Lys Ile Lys Thr Asp Arg Glu Gln Ala  
210 215 220

Glu Ala Thr Arg Leu Glu Asn Ile Lys Thr Asp Arg Glu Lys Ala Glu  
225 230 235 240

Glu Ala Lys Arg Lys Ala Glu Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
245 250 255

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
260 265 270

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa

|     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Xaa | Leu | Glu | Ile | Ala | Glu | Ser | Asp |     |
| 290 |     |     |     |     | 295 |     |     |     | 300 |     |     |     |     |     |     |
| Val | Lys | Val | Lys | Glu | Ala | Glu | Leu | Glu | Leu | Val | Lys | Glu | Glu | Ala | Lys |
| 305 |     |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |
| Glu | Ser | Arg | Asn | Glu | Glu | Lys | Val | Lys | Gln | Ala | Lys | Ala | Lys | Val | Glu |
|     |     |     |     | 325 |     |     |     |     | 330 |     |     |     |     | 335 |     |
| Ser | Lys | Gln | Ala | Glu | Ala | Thr | Arg | Leu | Glu | Lys | Ile | Lys | Thr | Asp | Arg |
|     |     |     | 340 |     |     |     |     | 345 |     |     |     |     | 350 |     |     |
| Lys | Lys | Ala | Glu | Glu | Glu | Ala | Lys | Arg | Lys | Ala | Ala | Glu | Glu | Asp | Lys |
|     |     | 355 |     |     |     |     | 360 |     |     |     |     | 365 |     |     |     |
| Val | Lys | Glu | Lys | Pro | Ala | Glu | Gln | Pro | Gln | Pro | Ala | Pro | Ala | Pro | Gln |
|     | 370 |     |     |     |     | 375 |     |     |     |     | 380 |     |     |     |     |
| Pro | Glu | Lys | Pro | Ala | Pro | Ala | Pro | Lys | Pro | Glu | Asn | Pro | Ala | Glu | Gln |
| 385 |     |     |     |     | 390 |     |     |     |     | 395 |     |     |     |     | 400 |
| Pro | Lys | Ala | Glu | Lys | Pro | Ala | Asp | Gln | Gln | Ala | Glu | Glu | Asp | Tyr | Ala |
|     |     |     |     | 405 |     |     |     |     | 410 |     |     |     |     | 415 |     |
| Arg | Arg | Ser | Glu | Glu | Glu | Tyr | Asn | Arg | Leu | Thr | Gln | Gln | Gln | Pro | Pro |
|     |     |     | 420 |     |     |     |     | 425 |     |     |     |     | 430 |     |     |
| Lys | Thr | Glu | Lys | Pro | Ala | Gln | Pro | Ser | Thr | Pro | Lys | Thr | Gly | Trp | Lys |
|     |     | 435 |     |     |     |     | 440 |     |     |     |     | 445 |     |     |     |
| Gln | Glu | Asn | Gly | Met | Trp | Tyr | Phe | Tyr | Asn | Thr | Asp | Gly | Ser | Met | Ala |
|     | 450 |     |     |     |     | 455 |     |     |     |     | 460 |     |     |     |     |
| Thr | Gly | Trp | Leu | Gln | Tyr | Asn | Gly | Ser | Trp | Tyr | Tyr | Leu | Asn | Ala | Asn |
| 465 |     |     |     |     | 470 |     |     |     |     | 475 |     |     |     |     | 480 |
| Gly | Asp | Met | Ala | Thr | Gly | Trp | Leu | Gln | Asn | Asn | Gly | Ser | Trp | Tyr | Tyr |
|     |     |     |     | 485 |     |     |     |     | 490 |     |     |     |     | 495 |     |
| Leu | Asn | Ala | Asn | Gly | Asp | Met | Ala | Thr | Gly | Trp | Leu | Gln | Asn | Asn | Gly |
|     |     |     | 500 |     |     |     |     | 505 |     |     |     |     | 510 |     |     |
| Ser | Trp | Tyr | Tyr | Leu | Asn | Ala | Asn | Gly | Asp | Met | Ala | Thr | Gly | Trp | Leu |
|     |     | 515 |     |     |     |     | 520 |     |     |     |     | 525 |     |     |     |

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Gln Asn Asn Gly Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Asp Met Ala  
530 535 540

Thr Gly Trp Val Lys Asp Gly Asp Thr Trp Tyr Tyr Leu Glu Ala Ser  
545 550 555 560

Gly Ala Met Lys Ala Ser Gln Trp Phe Lys Ala Ser Asp Lys Trp Tyr  
565 570 575

Tyr Val Asn Gly Ser Gly Ala Leu Ala Val Asn Thr Thr Val Asp Gly  
580 585 590

Tyr Gly Val Asn Ala Asn Gly Glu Trp Val Asn  
595 600

<210> 318

<211> 507

<212> PRT

<213> Streptococcus pneumoniae

<220>

<221> MISC\_FEATURE

<222> (223)..(272)

<223> Xaa represents undefined/missing amino acids due to unavailable sequencing information.

<400> 318

Met Phe Ala Ser Lys Ser Glu Arg Lys Val His Tyr Ser Ile Arg Lys  
1 5 10 15

Phe Ser Ile Gly Val Ala Ser Val Ala Val Ala Ser Leu Phe Met Gly  
20 25 30

Ser Val Val His Ala Thr Glu Lys Glu Val Thr Thr Gln Val Ala Thr  
35 40 45

Ser Ser Asn Lys Ala Asn Lys Ser Gln Thr Glu His Met Lys Ala Ala  
50 55 60

Lys Gln Val Asp Glu Tyr Ile Lys Lys Lys Leu Gln Leu Asp Arg Arg  
65 70 75 80

Lys His Thr Gln Asn Val Gly Leu Leu Thr Lys Leu Gly Val Ile Lys  
85 90 95

Thr Glu Tyr Leu His Gly Leu Ser Val Ser Lys Lys Lys Ser Glu Ala  
100 105 110

Glu Leu Pro Ser Glu Ile Lys Ala Lys Leu Asp Ala Ala Phe Glu Gln  
115 120 125



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Phe Lys Lys Asp Thr Leu Pro Thr Glu Pro Gly Lys Lys Val Ala Glu  
 130 135 140  
 Ala Glu Lys Lys Val Glu Glu Ala Lys Lys Lys Ala Glu Asp Gln Lys  
 145 150 155 160  
 Glu Lys Asp Leu Arg Asn Tyr Pro Thr Asn Thr Tyr Lys Thr Leu Glu  
 165 170 175  
 Leu Asp Ile Ala Glu Ser Asp Val Glu Val Lys Lys Ala Glu Leu Glu  
 180 185 190  
 Leu Val Lys Gly Ser Tyr Arg Asn Leu Glu Thr Arg Lys Lys Leu Ile  
 195 200 205  
 Lys Gln Ser Glu Lys Leu Arg Ile Lys Lys Leu Met Leu Gln Xaa Xaa  
 210 215 220  
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 225 230 235 240  
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 245 250 255  
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 260 265 270  
 Val Gln Asn Gly Met Trp Tyr Phe Tyr Asn Thr Asp Gly Ser Met Ala  
 275 280 285  
 Thr Gly Trp Leu Gln Asn Asn Gly Ser Trp Tyr Tyr Leu Asn Ser Asn  
 290 295 300  
 Gly Ala Met Ala Thr Gly Trp Leu Gln Asn Asn Gly Ser Trp Tyr Tyr  
 305 310 315 320  
 Leu Asn Ser Asn Gly Ala Met Ala Thr Gly Trp Leu Gln Tyr Asn Gly  
 325 330 335  
 Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Asp Met Ala Thr Gly Trp Phe  
 340 345 350  
 Gln Tyr Asn Gly Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Asp Met Ala  
 355 360 365  
 Thr Gly Trp Phe Gln Tyr Asn Gly Ser Trp Tyr Tyr Leu Asn Ala Asn

370

375

Gly Asp Met Ala Thr Gly Trp Phe Gln Tyr Asn Gly Ser Trp Tyr Tyr  
385 390 395 400

Leu Asn Ala Asn Gly Asp Met Ala Thr Gly Trp Leu Gln Tyr Asn Gly  
405 410 415

Ser Trp Tyr Tyr Leu Asn Ser Asn Gly Ala Met Val Thr Gly Trp Leu  
420 425 430

Gln Asn Asn Gly Ser Trp Tyr Tyr Leu Asn Ala Asn Gly Ser Met Ala  
435 440 445

Thr Asp Trp Val Lys Asp Gly Asp Thr Trp Tyr Tyr Leu Glu Ala Ser  
450 455 460

Gly Ala Met Lys Ala Ser Gln Trp Phe Lys Val Ser Asp Lys Trp Tyr  
465 470 475 480

Tyr Val Asn Gly Ser Gly Ala Leu Ala Val Asn Thr Thr Val Asp Ser  
485 490 495

Tyr Arg Val Asn Ala Asn Gly Glu Trp Val Asn  
500 505

<210> 319  
<211> 36  
<212> PRT  
<213> Mus musculus

<220>  
<221> PEPTIDE  
<222> (1)..(36)  
<223> Peptide derived from mouse cathelin

<400> 319

Arg Leu Ala Gly Leu Leu Arg Lys Gly Gly Glu Lys Ile Gly Glu Lys  
1 5 10 15

Leu Lys Lys Ile Gly Gln Lys Ile Lys Asn Phe Phe Gln Lys Leu Val  
20 25 30

Pro Gln Pro Glu  
35